वार्षिक प्रतिवेदन

Annual Report 2018 - 19

AICRP on Poultry Breeding and Poultry Seed Project

Annual Report 2018-19

भाकृअनुप - कुक्कुट अनुसंधान निदेशालय

ICAR - Directorate of Poultry Research

ISO 9001–2015

AICRP on Poultry Breeding and Poultry Seed Project

Centres across the Nation

ICAR - DPR

AICRP Centres

R1.	KVASU, Mannuthy
R2.	AAU, Anand
R3.	KVAFSU, Bengaluru
R4.	GADVASU, Ludhiana
R5.	ICAR-CARI, Izatnagar
R6.	OUAT, Bhubaneswar
R7.	ICAR-RC, Agartala
R8.	NDVSU, Jabalpur
R9.	AAU, Guwahati
R10.	BAU, Ranchi
R11.	MPUAT, Udaipur
R12.	CSKHPKVV, Palampur

PSP Centres

S1.	WBUAFS, Kolkata
S2.	BASU, Patna
S3.	TANUVAS, Hosur
S4.	ICAR RC, Sikkim
S5.	ICAR RC, Nagaland
S6.	ICAR RC, Manipur
S7.	SKUAST, Srinagar
S8.	ICAR-CCARI, Goa
S9.	ICAR-CIARI, Port Blair
S10.	PVNRTVU, Warangal
S11.	SVVU, Tirupati
S12.	ICAR-RC for NEHR, Barapani

AICRP on Poultry Breeding
and
Poultry Seed Project

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Front Cover
Graphic representation of rural poultry farming

Inside Front cover
Location of AICRP & PSP Centres

Inside Back Cover
Annual Review Meeting held at Umiam

Back Cover
Administrative cum Laboratory building & QR code of ICAR-DPR Mobile App

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Preface

The ICAR-Directorate of Poultry Research is a premier organization under the aegis of Indian Council of Agricultural Research mandated to conduct the research in frontier areas of poultry production in the country. The Directorate is coordinating and monitoring 12 centres of All India coordinated Research Project on Poultry Breeding and 12 centres of Poultry Seed Project. I feel privileged to present the Annual Report of AICRP on Poultry Breeding and PSP for the year 2018-19.

The AICRP on Poultry Breeding has been reoriented towards the rural poultry with an aim of developing location specific rural chicken varieties suitable for their local conditions. The elite layer and broiler pure lines developed earlier are being maintained for improvement of economic traits and use in development of rural crosses. Twelve Poultry Seed Project centres spread across the country are in operation with the aim of increasing the availability of improved germplasm throughout the country. The untiring efforts of all the staff of AICRP on Poultry Breeding and Poultry Seed Project lead to the effective propagation of backyard poultry in the country. Eleven success stories have been reported during the year from different centres. During the year 2018-19, a total of 14.55 lakhs of improved chicken germplasm has been distributed to the farmers across the country from different centres of AICRP on Poultry Breeding and Poultry Seed Project. An amount of Rs. 390.12 lakhs revenue was generated by supplying improved chicken germplasm.

I am extremely grateful to Dr. Trilochan Mohapatra, Secretary, DARE and Director General, ICAR for all the support and encouragement extended for effective functioning of the AICRP and PSP. I am thankful to the Secretary, ICAR and Financial Adviser, ICAR for their continuous support to the Directorate. I am thankful to Dr. J.K. Jena, DDG (AS) for his keen interest and guidance. I am thankful to Dr. R.S. Gandhi, ADG (AP&B); Dr. Vineet Bhasin, Principal Scientist (AG&B) and other scientific and administrative staff of the ICAR (HQ) for extending help from time to time. The research progress achieved could not have been possible without the support and contribution of the scientists of AICRP and PSP cell at the Institute and all the PIs of AICRP and PSP, who deserves due appreciation. I also thank all other staff for supporting the scientists in their research endeavor. I also thank the editorial committee in bringing out this report in an appreciable manner.

Date : 24-07-2019

(R.N. Chatterjee)
Director

Abbreviations

ASM	Age at sexual maturity in days
BW16	Body weight at 16 weeks of age
BW40	Body weight at 40 weeks of age
BW64	Body weight at 64 weeks of age
BW72	Body weight at 72 weeks of age
EP40	Egg production number upto 40 weeks of age
EP64	Egg production number upto 64 weeks of age
EP72	Egg production number upto 72 weeks of age
EW28	Egg weight at 28 weeks of age
EW40	Egg weight at 40 week of age
EW64	Egg weight at 64 weeks of age
EW72	Egg weight at 72 weeks of age
FC	Feed consumption
FCR	Feed conversion ratio
Gen.	Generation
HH	Hen housed
HD	Hen day
S	Survivors'

Contents

Poultry Seed Project

कार्यकारी सारांश

कुक्कुट प्रजनन पर अखिल भारतीय समन्वयन अनुसंधान परियोजना (एआईसीआरपी)

कुक्कुट प्रजनन पर एआईसीआरपी को ग्रामीण कुक्कुट पालन की दिशा की ओर अग्रसर किया गया। वर्तमान में यह परियोजना बारह केंद्रों में संचालित की जा रही है जैसे - केवीएएसयू, मन्नुति, एएयू, आनंद, केवीएएफएसयू, बेंगलूरू, जीएडीवीएएसयू, लूधियाणा, ओयूएटी, भुवनेश्वर, सीएआरआई, इज्ज़तनगर, एनईएच क्षेत्र भाकृअनुप अनुसंधान कांप्लेक्स, अगरताला, एनडीयूएसयू, जबलपूर, एएयू, गुवाहाटी, बीएयू, रांची, एमपीयूएटी, उदयपूर एवं सीएसकेएचपीकेवीवी, पालंपूर है। परियोजना का मुख्य उद्देश्य ग्रामीण, आदिवासीय एवं खुले घर आंगन क्षेत्रों में ग्रामीण कुक्कुट उद्यमशीलता हेतु स्थानीय विशिष्ट, स्थान विशेषक एवं विशिष्ट ब्रायलर तथा लेयर कुक्कुट किस्मों के जर्मप्लाज्म का संरक्षण, सुधार के अनुप्रयोगों के प्रथाओं के पैकेज का विकास करना है। इसके अलावा केवीएएसयू, मन्नुति, एएयू, आनंद केंद्र दो कुलीन लेयर जर्मप्लाज्म (आईडब्ल्यूएन एवं आईडब्ल्यूपी) को बनाए रखे हैं। केवीएएफएसयू, बेंगलूरू जीएडीवीएएवयू, लुधियाणा, ओयूएटी, भुवनेश्वर, सीएआरआई, इज्ज़तनगर केंद्र चार विशिष्ट ब्रायलर जर्मप्लाज्म (पीबी-1, पीबी-2, सीएसएमएल तथा एवं सीएसएफएल) को बनाए रखे हैं।

भाकृअनुप -कुक्कुट अनुसंधान निदेशालय में दो यादृच्छिक नियंत्रण वंशावलियों (लेयर के लिए एक एवं ब्रायलर के लिए एक) का मूल्यांकन तथा पुनरूत्पादन किया गया। इन वंशावलियों के अंडों के नमूनों की आनुवंशिक प्रगति को मापने के लिए इसे कुक्कुट प्रजनन पर स्थित विभिन्न एआईसीआरपी केंद्रों को भेजा गया। परिषद द्वारा लिए गए निर्णयानुसार विभिन्न एआईसीआरपी केंद्रों एवं भाकृअनुप-डीपीआर में बनाए रखे गए किस्मों को विभिन्न एआईसीआरपी केन्द्रों में उपयोग किया जाएगा ताकि जिससे अत्यावश्यक समय में त्रिमार्गीय एवं चौ-मार्गीय पद्घति द्वारा उत्पादन के लिए केंद्र द्वारा संसाधन जनसंख्या के रूप में उपयोग किए जा सकें। विभिन्न एआईसीआरपी केंद्रों में इनका प्रतिरूप किया गया, जो है - मन्नुति में आईडब्लूएफ, आनंद में आईडब्लूडी एवं आईडब्लूके तथा जबलपूर में एम-1 एम-2 है। वर्ष के दौरान रूपए 223.47 लाख राजस्व प्राप्त करते हुए विभिन्न केंद्रों के किसानों को कुल 8,07,869 कुक्कुट जर्मप्लाज्म वितरित किए गए।

केवीएएसयू, मन्नुति केंद्र ने 40 सप्ताह तक देशी कुक्कुट जर्मप्लाज्म की एस-3 पीढ़ी का मूल्यांकन किया। पिछले पुश्त की तुलना में 40 सप्ताह की आयु तक देशी कुक्कुट जर्मप्लाज्म का अंडा उत्पादन 79.20 ग्राम के औसत वजन के साथ 3.24 अंडे रहा। एनडीआर (त्रिमार्गीय संकर में) ने खुले क्षेत्र की स्थिति के तहत 72 सप्ताह की उम्र तक 217.78 अंडों का उत्पादन किया। केंद्र ने नियंत्रित लेयर वंशावली को 64 सप्ताह की आयु तक S-30 पीढ़ी के साथ-साथ IWN एवं IWP का भी मूल्यांकन किया । एस-30 पीढ़ी में 64 सप्ताह की आयु तक अंडे का उत्पादन क्रमशः IWN एवं IWP उपभेदों में 3 अंडों की वृद्धि एवं 4.9 अंडों की कमी हुई। 64 सप्ताह तक अंडे का उत्पादन एवं 64 सप्ताह की आयु में अंडे के वजन के लिए आनुवंशिक प्रतिक्रिया एस-30 पीढ़ी के IWN एवं IWP दोनों नस्लों में नकारात्मक रही । इस केंद्र ने 35.01 लाख रुपये का राजस्व उत्पन्न किया, जो दाना पर खर्च कुल का 131% रहा। केंद्र ने वर्ष के दौरान किसानों को कुल 1,33,829 कुक्कुट जर्मप्लाज्म वितरित किया।

एएयू, आनंद केंद्र ने वर्ष के दौरान देशी कुक्कुट एवं सफेद लेगॉर्न लाइनों (IWN, IWP, IWD एवं IWF) का मूल्यांकन किया। एस-2 पीढ़ी में 40 सप्ताह की आयु तक अंडे का उत्पादन 66.40 अंडे रहा जो एस-1 (71.29 अंडे) की तुलना में कम था। 40 सप्ताह की आयु तक फार्म एवं खेत की स्थिति के तहत त्रिमार्गीय संकर (IWN x देशज x RIR) का मूल्यांकन किया गया। 40 सप्ताह तक अंडे उत्पादन क्रमशः 77 एवं 62 अंडे रहा। मन्नुति से लाए गए मूल वंशावली में 40 सप्ताह की आयु तक अंडा उत्पादन IWN एवं IWP में क्रमश: 122.67 एवं 121.13 अंडे रहा। केंद्र ने वर्ष के दौरान 1,006 किसानों को कुल 46,983 कुक्कुट जर्मप्लाज्म की आपूर्ति की है। केंद्र ने रू.26.16 लाख राजस्व उत्पन्न किया जो दाना पर खर्च व्यय (30.29 लाख) का 86% रहा।

केवीएएफएसयू, बेंगलुरु केंद्र ने देशी कुक्कुट पीबी-1 एवं पीबी-2 एवं उनके संकरों का मूल्यांकन किया। एस-3 पीढ़ी में एक दिन की आयु के एवं 8 सप्ताह के देशज कुक्कुटों का औसत शरीर का वजन क्रमश: 30.37 एवं 464.9 ग्राम था। 0-8 सप्ताह में दाना दक्षता 3.15 रही। 0-8 सप्ताह में समग्र उत्तरजीविता 97.16% रही। F2 (PB-1 x देशज x PB-2) नर एवं मादा कुक्कुटों आठवें सप्ताह में औसत शरीर का वजन क्रमशः 1,255 एवं 1,106 g रहा। FCR (0-8 wks) 2.72 रहा। पीबी -2 एवं नियंत्रण वंशावलियों में 5 सप्ताह की आयु में शरीर का वजन बढ़ गया। पीबी-1, पीबी-2 एवं नियंत्रण वंशावलियों में 40 सप्ताह की आयु में औसत अंडा उत्पादन क्रमशः 63.81, 61.25 एवं 63.48 अंडे रहा। 12 पीढ़ियों से 5 सप्ताह में शरीर के वजन की औसत फेनोटाइपिक एवं आनुवांशिक प्रतिक्रिया पीबी -1 एवं पीबी -2 में क्रमशः 10.40 एवं 20.44 ग्राम, जो पिछले 13 पीढ़ियों से अधिक रहा। 365 किसानों को कुल 1,95,795 जर्मप्लाज्म की आपूर्ति की गई। केंद्र ने रुपये 52.34 लाख का राजस्व उत्पन्न किया, जो दाना लागत (रु .9.94 लाख) पर व्यय का 169% रहा ।

लुधियाना केंद्र ने स्थानीय देशी कुक्कुट (पंजाब ब्राउन), पीबी-1 एवं पीबी-2 का मूल्यांकन किया। एक दिन की आयु, 4 एवं 8 सप्ताह की आयु में देशी जर्मप्लाज्म का शरीर का वजन क्रमशः 37.74, 370.2, 765 ग्राम रहा। पीबी-2 x देसी संकर के 40 सप्ताह तक के अंडे का उत्पादन फार्म में 58.74 एवं क्षेत्र में 55.62 अंडे रहा। 5 सप्ताह की आयु में शरीर का औसत वजन पीबी-1, पीबी -2 एवं कंट्रोल वंशावलियों में क्रमश: 1,166, 1,071 एवं 826 ग्राम रहा। 5 सप्ताह की आयु में शरीर का वजन पीबी-2 लाइन में वृद्धि हुई एवं यह पिछली पीढ़ी की तुलना में पीबी-1 एवं कंट्रोल वंशावलियों में कम हुआ। पीबी-1, पीबी-2 एवं कंट्रोल वंशावलियों में 40 सप्ताह तक के अंडे का उत्पादन क्रमशः 64.66, 68.61 एवं 55.36 अंडे रहा । पीबी-1 में पिछली 11 पीढ़ियों से आनुवंशिक प्रतिक्रिया पर 5 सप्ताह के शरीर का वजन 20.65 ग्राम एवं पीबी-2 में 11.52 ग्राम रहा। 300 किसानों को कुल 1,02,049 जर्मप्लाज्म की आपूर्ति की गई। केंद्र ने Rs.25.25 लाख रूपए का राजस्व उत्पन्न किया जो दाना पर व्यय लागत (रुपये 22.80 लाख) का 121% रहा।

भाकृअनुप -सीएआरआई केंद्र ने 2018-19 के दौरान स्थानीय देशी कुक्कुट CSML एवं CSFL का मूल्यांकन किया। 6 एवं 12 सप्ताह में स्थानीय देशी कुक्कुट जर्मप्लाज्म का शरीर का वजन क्रमशः 504.6 एवं 1,140 ग्राम रहा, 6, 8 एवं 12 सप्ताह में CSML X देसी पक्षियों का शरीर का वजन क्रमशः 1,065, 1,368 एवं 1,847 ग्राम रहा। 5 सप्ताह में शरीर का वजन CSML एवं CSFL में समान रूप से बना रहा एवं नियंत्रित वंशावलियों में यह कम हुआ। CSML एवं CSFL में 5 सप्ताह की आयु में FCR दर 1.80 एवं 1.81 रहा। सीएसएमएल एवं सीएसएफएल में 40 सप्ताह तक अंडे के उत्पादन में वृद्धि हुई एवं पिछली पीढ़ी की तुलना में यह नियंत्रित वंशावलियों में कम हुई। सीएसएमएल एवं सीएसएफएल में 5 सप्ताह प्रति पीढ़ी पर शरीर के वजन की फेनोटाइपिक प्रतिक्रिया क्रमशः 14.77 एवं 14.69 ग्राम रही, आनुवंशिक प्रतिक्रिया क्रमशः 15.13 एवं 15.01 ग्राम रही । कैरीब्रोधनराजा™ का ट्रेडमार्क प्राप्त किया गया। किसानों को कुल 51,388 जर्मप्लाज्म की आपूर्ति कर रू.8.03 लाख का राजस्व सृजन किया गया।

भुवनेश्वर केंद्र ने वर्ष के दौरान हंसली, सीएसएमएल, सीएसएफएल एवं उनके संकरों का मूल्यांकन किया। एक दिन की आयु के चूज़ों का औसत वजन एवं 8 सप्ताह का हंसली का वज़न क्रमश: 32.34 एवं 587 ग्राम था। हंसली (एस-2) में 40 एवं 50 सप्ताह तक अंडे का उत्पादन क्रमशः 23.14 एवं 33.25 अंडे रहा। चालू वर्ष में 5 सप्ताह में शरीर का वजन एवं CSFL एवं CSML में क्रमश: 1,025 एवं 1,129 ग्राम रहा जो पिछली पीढ़ी से बेहतर रहा। CSFL एवं CSML में 40 सप्ताह तक के अंडे का उत्पादन क्रमशः 52.39 एवं 66.45 अंडे रहा। केंद्र ने किसानों को 18,810 एक दिन की आयु के चूजों की आपूर्ति की तथा रु. 4.44 लाख, का राजस्व उत्पन्न किया है, जो दाना पर व्यय कुल लागत (रु। 14.12 लाख) का 31% रहा।

त्रिपुरा केंद्र ने त्रिपुरा ब्लैक, दहलमरेड, ब्रायलर मादा वंशावली, बीएन एवं बीएनडी संकर का मूल्यांकन किया। रहा। त्रिपुरा ब्लैक, दहलमरेड, रंगीन ब्रायलर मादा वंशावली एवं बीएन संकर में 8 सप्ताह में शरीर का वजन क्रमशः 306.5, 495, 1,102 एवं 512.9 ग्राम रहा एवं 20 सप्ताह में यह 1,116, 1,601, 2,789 एवं 1,593 ग्राम रहा। फार्म एवं क्षेत्र में बीएनडी

संकर में 8 सप्ताह का वजन क्रमशः 499 एवं 403 ग्राम रहा। E-3 के मूल्यांकन के दौरान 52 सप्ताह के अंडे का उत्पादन बीएनडी संकर में फार्म एवं क्षेत्र की परिस्थितियों में क्रमश: 94.8 एवं 82.75 अंडे रहा। आदिवासी किसानों के लिए खुले घर आंगन कुक्कुट पालन पर कुल चार प्रशिक्षण कार्यक्रम आयोजित किए गए। 2018-19 के दौरान 300 लाभार्थियों को कुल 25,275 जर्मप्लाज्म की आपूर्ति की गई। केंद्र ने रुपये 10.26 लाख का राजस्व उत्पन्न किया, जो दाना लागत पर 59% व्यय (रु। 17.40 लाख) रहा ।

जबलपुर केंद्र ने कड़कनाथ के जी-9 पीढ़ी एवं जबलपुर रंगीन कुक्कुटों का 52 सप्ताह तक मूल्यांकन किया। 52 सप्ताह की आयु तक फार्म एवं क्षेत्र स्थिति में नर्मदानिधि कुक्कुटों का मूल्यांकन किया गया। कड़कनाथ एवं जबलपुर रंगीन कुक्कुटों का 6 सप्ताह में शरीर का वजन क्रमशः 343.3 एवं 803.7 ग्राम रहा। 40 सप्ताह की आयु तक मुर्गी के अंडे का उत्पादन जेबीसी में 91.9 अंडे एवं कड़कनाथ में 57.3 अंडे रहा। नर्मदनिधि ने क्षेत्र की परिस्थितियों में 72 सप्ताह तक 40, 52 एवं 49, 88 एवं 176 अंडों का उत्पादन किया। फार्म एवं क्षेत्र दोनों स्थितियों में अंडे का उत्पादन बढ़ा है। 184 लाभार्थियों को कुल 56,432 जर्मप्लाज्म की आपूर्ति की गई। केंद्र ने रुपये 20.67 लाख का राजस्व उत्पन्न किया, जो दाना पर व्यय (17.90 लाख) का 116% रहा।

गुवाहाटी केंद्र ने वर्ष के दौरान देशी, दहलमरेड, पीबी-2 एवं कामरूप जीवियों का मूल्यांकन किया। 5 सप्ताह का शरीर का वजन देशज कुक्कुटों में 132.5 ग्राम, पीबी-2 में 1,165 ग्राम एवं दहेलमरेड में 360.2 ग्राम था। देशी कुकुटों में 52 सप्ताह तक अंडे का उत्पादन 67.50 अंडे रहा। दहलेमरेड में 52 सप्ताह तक अंडे का उत्पादन 120.60 अंडे रहा जो पिछली पीढ़ी के 3.1 अंडे से बेहतर रहा। कामरूप में 5 सप्ताह का शरीर का वज़न फार्म एवं क्षेत्र में क्रमशः 250.5 एवं 210.6 ग्राम था। 40 एवं 52 सप्ताह की आयु तक के अंडे का उत्पादन फार्म में क्रमशः 49.20 एवं 90.40 अंडे एवं क्षेत्र की स्थिति में 43.60 एवं 73.70 अंडे रहा। केंद्र ने किसानों को 30,720 जर्मप्लाज्म की आपूर्ति कर रुपये 6.26 लाख की प्राप्ति की जो दाना लागत (रु। 12.09 लाख) पर व्यय का 52% रहा।

रांची केंद्र ने देशी कुक्कुट, दहलेमरेड, पीबी -2 एवं उनके संकर, झारसिम का मूल्यांकन किया। 20 सप्ताह की आयु में शरीर का वजन देशी में 989.2 एवं दहलेमरेड में 1,218 रहा। देशी एवं दहलमरेड में 40 सप्ताह तक का अंडे का उत्पादन क्रमशः 32.33 एवं 45.38 अंडे रहा । 20 सप्ताह की आयु में नर कुक्कुटों का वज़न 1,791 ग्राम एवं मादाओं का 1,554 ग्राम रहा । केंद्र ने किसानों को 25,323 जर्मप्लाज्म की आपूर्ति कर रुपये 6.70 लाख का राजस्व उत्पन्न किया जो दाना लागत पर 87% रहा।

वर्ष 2018-19 के दौरान आपूर्ति किए गए जर्मप्लाज्म एवं राजस्व प्राप्ती का विवरण

केंद्र	जर्मप्लाज्म	राजस्व (रू.लाख)
केरल पशु चिकित्सा एवं पशु विज्ञान विश्व विद्यालय, मन्नुति	1,33,829	35.01
आनंद कृषि विश्वविद्यालय, आनंद	46,983	26.16
कर्नाटक पशु चिकित्सा, पशु एवं मत्स्य विज्ञान विश्वविद्यालय, बेंगलूरू	1,95,795	52.34
गुरू अंगद देव पशु चिकित्सा एवं पशु विज्ञान विश्वविद्यालय, लुधियाणा	1,02,049	25.51
उडिशा कृषि एवं प्रौद्योगिकी विश्वविद्यालय, भुवनेश्वर	18,810	4.44
केंद्रिय पक्षि अनुसंधान संस्थान, इज्ज़तनगर	51,388	8.03
महाराणा प्रताप कृषि एवं प्रौद्योगिकी विश्वविद्यालय, उदयपूर	76,681	14.90
नानाजी देशमुख पशु चिकित्सा विज्ञान विश्वविद्यालय, जबलपूर	56,432	20.67
असम कृषि विश्वविद्यालय, गुवाहाटी	30,720	6.26
सीएसके हिमाचल प्रदेश कृषि विश्वविद्यालय, पालमपूर	44,584	13.19
बिरसा कृषि विश्वविद्यालय, रांची	25,323	6.70
भाकृअनुप एनईएच क्षेत्र अनुसंधान कांप्लेक्स, अगरताला	25,275	10.26
कुल	**8,07,869**	**223.47**

पालमपुर केंद्र ने वर्ष के दौरान देशी, दहलमरेड एवं हिमसमृद्धि कुक्कुटों का मूल्यांकन किया। देशी एवं दहलमरेड में 8 सप्ताह की आयु में शरीर का वजन क्रमशः 530.3 एवं 617.1 ग्राम रहा। 52 सप्ताह की आयु तक अंडे का उत्पादन देशी में 84.31 एवं दहलेमरेड में 148.35 अंडे रहा। अंडे के उत्पादन में पिछले वर्ष की तुलना में देशी एवं डीआर जीवियों में सुधार दिखाई दिया। हिमसमृद्धि का वार्षिक अंडा उत्पादन (72 सप्ताह) मैदानी परिस्थितियों में 145.65 अंडे रहा। वर्ष के दौरान केंद्र ने हिमाचल प्रदेश में 631 किसानों को 44,584 कुक्कुट जर्मप्लाज्म की आपूर्ति की। केंद्र को वित्तीय वर्ष के दौरान 13.19 लाख रुपये की प्राप्ति हुई जो दाना लागत (18.90 लाख रुपये) पर व्यय का 70% रहा।

उदयपुर केंद्र ने मेवाड़ी, आरआईआर, सीएसएफएल बीएन एवं बीएनआर जीवियों का मूल्यांकन किया। मेवाड़ी में ई-7 के दौरान आठ सप्ताह का वजन 640.9 था, जो पिछली पीढ़ी से बढ़ा। मेवाड़ी कुक्कुट में 52 सप्ताह तक अंडा उत्पादन 69.23 अंडे रहा। प्रतापधन में क्रमशः 40, 52 एवं 72 सप्ताह तक अंडा उत्पादन 62.26, 100.42 एवं 166.10 अंडे रहा। यहां अंडा उत्पादन में पिछली पीढ़ी से घटती हुई रुझान देखी गयी। मौजूदा वर्ष के दौरान कुल 76,681 कुक्कुट जर्मप्लाज्म की आपूर्ति कर केंद्र ने रुपये 14.90 लाख की प्राप्ति की जो दाना पर व्यय लागत का 95% रहा।

कुक्कुट बीज परियोजना

«कुक्कुट बीज परियोजना» को हमारे देश के दूरस्थ क्षेत्रों में ग्रामीण कुक्कुट जर्मप्लाज्म की उपलब्धता में वृद्धि करने के उद्देश्य से विकसित किया गया। इस प्रयास में भारतीय कृषि अनुसंधान परिषद ने ग्यारहवीं पंचवर्षीय योजना के दौरान छः केंद्रों - पूर्वोत्तर क्षेत्र में तीन और विभिन्न राज्य पशु-चिकित्सा/ कृषि विश्वविद्यालयों में तीन «कुक्कुट बीज परियोजना» केंद्रों को आरंभ किया। परियोजना को अपने संबंधित क्षेत्रों में किसानों की जरूरतों को पूरा करने के लिए पांच और केंद्र जोड़कर बारहवीं योजना के दौरान इसे और मजबूत किया गया। इसके अलावा एक गैर निधि केंद्र भी काम कर रहा है। इस समय पूरे देश में इसके 12 केंद्र कार्य कर रहे हैं। इस परियोजना का मुख्य उद्देश्य स्थानीय रूप से बेहतर कुक्कुट जर्मप्लाज्म (उपजाऊ अंडे, एक दिन की आयु के चूज़ों और वयस्क चूज़ों) का उत्पादन करना तथा ग्रामीण कुक्कुट उत्पादन को बढ़ाने के लिए दूरदराज के इलाकों में विभिन्न हितधारकों को अंडे और मांस के उत्पादन की लक्षित आपूर्ती में वृद्धि करते हुए लक्षित समूहों के सामाजिक-आर्थिक स्थिति एवं संगठित बाजार के द्वारा छोटे पैमाने के कुक्कुट उत्पादकों को जोड़ना है।

कुक्कुट बीज परियोना केंद्र पश्चिम बंगाल पशु एवं मत्स्य विज्ञान विश्वविद्यालय, कोलकाता ; बिहार पशु विज्ञान विश्वविद्यालय, पटना; भाकृअनुप रिसर्च कॉम्प्लेक्स, एनईएच क्षेत्र, नागालैंड क्षेत्रीय केंद्र, झरनापानी; भाकृअनुप -राष्ट्रीय जैविक खेती अनुसंधान संस्थान, गैंगटॉक; एनईएच क्षेत्र भाकृअनुप रिसर्च कॉम्प्लेक्स, मणिपुर क्षेत्रीय केंद्र, इम्फाल; तमिलनाडु पशु चिकित्सा एवं पशु विज्ञान विश्वविद्यालय, होसूर, भाकृअनुप -केंद्रीय तटीय कृषि अनुसंधान संस्थान, पणजी; भाकृअनुप -केंद्रीय द्वीप कृषि अनुसंधान संस्थान, पोर्टब्लेयर; शेर-ए-कश्मीर कृषि विज्ञान एवं प्रौद्योगिकी विश्वविद्यालय, श्रीनगर में स्थित है। इस परियोजना को तीन और केंद्रों के द्वारा मजबूत किया गया, जो है - पीवीएनआर तेलंगाना पशु चिकित्सा विश्वविद्यालय, वारंगल; श्री वेंकटेश्वरा पशु चिकित्सा विश्वविद्यालय, तिरुपति, एनईएच क्षेत्र हेतु भाकृअनुप रिसर्च कॉम्प्लेक्स, उमियम है ।

यह निदेशालय एक समन्वयक इकाई के रूप में पेरेंट चूजों की आपूर्ति करता है तथा विभिन्न केंद्रों की गतिविधियों पर नज़र रखता है ताकि वे प्रत्येक केंद्र के लिए निर्धारित लक्ष्य प्राप्त कर सकें। वर्ष 2018-19 के दौरान मुख्य भूमि और उत्तर-पूर्वी केंद्रों के लिए चूज़ों की आपूर्ति हेतु विभिन्न केंद्रों के लिए प्रति वर्ष 0.3 और 1.0 लाख चूज़ों के बीच लक्ष्य निर्धारित करना तथा खुले आंगन की स्थिति में पालन के तहत जर्मप्लाज्म के प्रदर्शन पर प्रतिक्रिया एकत्र करना है । इस वर्ष के दौरान अपने संबंधित क्षेत्रों / राज्यों में कुल 647194 विकसित कुक्कुट किस्मों को वितरित किया गया, जिससे यह केंद्र कुल रु.166.65 लाख राजस्व प्राप्त किया।

कोलकाता केंद्र में वानराजा पेरेंटों के आठ बैचों को इस वर्ष के दौरान पाला गया, जिनमें से पांच को अंडे देने एवं तीन बैचों को आर्थिक रूप से अंडों के समाप्ती के बाद समाप्त कर दिया गया। 31 सप्ताह में 50% अंडों का उत्पादन प्राप्त किया गया एवं इसे 67 सप्ताह

तक बनाए रखा गया। प्रजनन क्षमता 86.28% से 91.16% तक रही । पूरे जीवन चक्र में कुल रखे गए अंडे (टीईएस) और रखे गए उपजाऊ अंडों (एफईएस) पर सेननता क्रमश: 81.52% (टीईएस) एवं 88.32% (एफईएस) रही । वर्ष 2018-19 के दौरान पश्चिम बंगाल के विभिन्न प्रांतों में किसानों को कुल 92,848 वनराजा चूजों को वितरित किया गया। कुल रुपये 17.92 लाख राजस्व उत्पन्न किया गया ।

पटना केंद्र में वनराज पेरेंटों के दो बैचों को पाला गया। वानरजा के मादा कुक्कुटों में यौन परिपक्वता की औसत आयु 180 दिन रही। 36 सप्ताह की आयु में वानराजा में एचडीईपी 50.88 ग्राम अंडे के वजन के साथ 51.35% रही। वनराज मादा वंशावली में टीईईएस एवं एफईएस पर औसत हैचबिलिटी, प्रजनन क्षमता प्रतिशत क्रमश: 78.27 एवं 68.37% एवं 72.54% रही। वर्ष 2018-19 के दौरान कुल 69,179 वनराजा कुक्कुट जर्मप्लाज्म को बिहार के किसानों में वितरित कर रू. 12. 03 लाख राजस्व प्राप्त किया गया।

झरनापानी केंद्र में वर्तमान में वनराज एवं श्रीनिधि के कुल 2042 पेरेंट बनाए रखे गए हैं। वानराजा पेरेंटों में 36 सप्ताह की आयु में 50% का उत्पादन प्राप्त किया गया। वानराजा एवं श्रीनिधि मादा वंशावलियों में कुल प्रजनन दर क्रमशः 73.58 एवं 81.9 रही। श्रीनिधि एवं वनराजा पेरेंटों में वनरजा में रखे गए उपजाऊ अंडों ट पर सेननता क्रमश: 69.66%, एवं 70.11% रही। वर्ष 2018-19 के दौरान नागालैंड एवं पड़ोसी राज्यों के किसानों को कुल 83508 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। झरनापानी के कुक्कुट बीज परियोजना केंद्र से कुल रू. 33.33 लाख राजस्व प्राप्त किया गया। केंद्र ने जर्मप्लाज्म की आपूर्ती का निर्धारित लक्ष्य प्राप्त किया।

वानरजा पेरेंटों के दो बैचों को आईसीएआर-एनओएफआरआई, गंगटोक, सिक्किम केंद्र में पाले गए। वर्ष के दौरान वनराज का औसत HDEP 51.74 (24-72 सप्ताह) रहा। 31-34 सप्ताह की आयु में उच्चतम उत्पादन (72%) प्राप्त किया गया। वनराजा मादा वंशावली में औसत प्रजनन क्षमता एवं सेननता (टीईएस) की दर क्रमशः 87.53 एवं 78.83% रही। सिक्किम राज्य के 667 गाँवों के 3371 किसानों को कुल 89495 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रू..77 लाख राजस्व प्राप्त किया। केंद्र ने जर्मप्लाज्म का निर्धारित लक्ष्य प्राप्त किया।

वनराज, ग्रामप्रिया एवं श्रीनिधि पेरेंटों के तीन बैचों को इस वर्ष के दौरान मणिपुर केंद्र में रखा गया। वानरजा में औसत एचएचईपी 18.57% (55-72 सप्ताह) एवं श्रीनिधि पेरेंटों में 32.7% (24-72 सप्ताह) रही। वनराज एवं श्रीनिधि के पेरेंटों में प्रजनन क्षमता क्रमशः 80.65 एवं 86.06% रही। टीईएस पर हैचबिलिटी वनराज में 58.05% एवं श्रीनिधि पेरेंटों में 66.73% रही। मणिपुर में किसानों को कुल 79,425 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। केंद्र ने वर्ष 2018-19 के दौरान रू.22.4 लाख राजस्व प्राप्त किया। केंद्र ने जर्मप्लाज्म की आपूर्ती का निर्धारित लक्ष्य प्राप्त किया।

रिपोर्टिंग अवधि के दौरान वानराजा के चार एवं ग्रामप्रिया के तीन बैचों को होसुर केंद्र में पाला गया। 42 से 72 वर्ष की आयु के बीच एचडीएआर 69 से 52% श्रेणी के बीच रहा एवं वानरजा (III बैच) में 72 सप्ताह की आयु में एचएचईपी 175 तक रहा। इसी प्रकार 23 से 72 सप्ताह की आयु के बीच ग्रामप्रीया (तृतीय बैच) में एचएचईपी- 72 सप्ताह की में 191 के साथ एचडीईपी 86 - 64% के बीच रही। वनराजा में औसत प्रजनन क्षमता 88.33 (42-72 सप्ताह) एवं ग्रामप्रिया में 87.65% (28-72 सप्ताह) रही। तमिलनाडु में 1248 किसानों को कुल 1,42,674 उन्नत ग्रामीण कुक्कुट (वनराजा एवं ग्रामप्रिया) जर्मप्लाज्म वितरित किया गया। केंद्र ने वर्ष के दौरान रू; 36.03 लाख राजस्व उत्पन्न किया। केंद्र ने जर्मप्लाज्म की आपूर्ती का निर्धारित लक्ष्य प्राप्त किया।

श्रीनिधि के पेरेंटों के एक बैच को वर्ष के दौरान गोवा में पाला गया था। श्रीनिधि के मादा एवं नर कुक्कुटों का वजन क्रमशः 1270.50 एवं 3042.00 ग्राम रहा। गोवा में 42 किसानों को कुल 1,357 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु. 2,27,708 राजस्व प्राप्त किया गया।

पोर्ट ब्लेयर में गहरे कूड़े की व्यवस्था के तहत वनराजा पेरेंटों के दो बैचों को पाला गया। वानरजा मादा वंशावली में यौन परिपक्वता (एएसएम) की आयु 178 दिन रही । 40 वें सप्ताह में HDEP उच्चतम (37.87%) रहा। वर्ष के दौरान अंडमान एवं निकोबार द्वीप समूह में 246 किसानों को कुल 21,009 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु.97,250 राजस्व प्राप्त किया गया।

वनराजा प्रजनकों के दो बैचों को वर्ष 2018-19 के दौरान पाला गया। पहले अंडे के समय आयु 170 दिन रही। 56 सप्ताह से 72 सप्ताह की आयु तक औसत अंडे का उत्पादन 60% (59-62%) से अधिक रहा। वनराजा पेरेंटों में कुल रखे गए अंडों पर औसत सेननता 60.11% रही। जम्मू एवं कश्मीर के किसानों को कुल 37,630 वनराजा जर्मप्लाज्म वितरित किए गए।

वनरजा एवं श्रीनिधि के दो बैचों को आईसीएआर एनईएच क्षेत्र क्षेत्रीय केंद्र, उमियम, बारापानी में पाला गया। 52 सप्ताह की आयु में वानरजा में HDEP 33.5% एवं श्रीनिधि पेरेंटों में 27% रहा। वनराज पेरेंटों में प्रजनन क्षमता एवं सेननता (टीईएस) क्रमशः 79-87% एवं 61-75% रही एवं श्रीनिधि पेरेंटों में यह 79-83% एवं 56-62% रही। मेघालय में किसानों को कुल 30206 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। वर्ष 2018-19 के दौरान 11.61 लाख राजस्व प्राप्त हुआ।

एसवीवीयू, तिरुपति, आंध्रप्रदेश में वनराज पेरेंटों के एक बैच को रखा गया। कुल 8763 चूज़े किसानों को आपूर्ति की गई एवं इस अवधि के दौरान चूजों एवं अंडों की बिक्री से रू. 3.23 लाख राजस्व प्राप्त हुआ।

रिपोर्टिंग अवधि के दौरान वनराजा एवं ग्रामप्रिया पेरेंटों के दो बैच पीवीएनआर टीवीयू, वारंगल, तेलंगाना में पाले गए। वनरजा मादा वंशावली में एएसएम 142 दिन (20 वें दिन) था। अंडे देने के पूरे काल चक्र में सबसे अधिक अंडे का उत्पादन (67.38%) 46 वें सप्ताह में दर्ज किया गया। औसत HDEP 41.50 (28-52 सप्ताह) रहा। वनराजा पेरेंटों में औसत प्रजनन क्षमता 83.67% (24-51 सप्ताह) रही। किसानों को कुल 10,223 उन्नत ग्रामीण कुक्कुट जर्मप्लाज्म (वनराजा) वितरित किया गया। वर्ष के दौरान केंद्र ने कुल रु.1.81 लाख राजस्व प्राप्त किया।

कुक्कुट बीज परियोजना के तहत जर्मप्लाज्म का केंद्रवार वितरण

क्रम सं	केंद्र	जर्मप्लाज्म (सं)	राजस्व (रू. लाखों में)
1	पश्चिम बंगाल पशु एवं मत्स विज्ञान विश्वविद्यालय, कोलकाता	92,848	17.92
2	बिहार पशु विज्ञान विश्वविद्यालय, पटना	69,179	12.3
3	भाकृअनुप अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, झरनापानी	83,508	33.33
4	भाकृअनुप अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, गैंगटॉक	89,495	16.77
5	भाकृअनुप उत्तर पूर्वी पर्वतीय क्षेत्र अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, इंफाल	79,425	22.41
6	तमिलनाडु पशु चिकित्सा एवं पशु विज्ञान विश्वविद्यालय, होसूर	1,42,674	36.03
7	भाकृअनुप - केंद्रीय तटीय कृषि अनुसंधान संस्थान,गोवा	1,220	2.27
8	भाकृअनुप - केंद्रीय द्वीप कृषि अनुसंधान संस्थान, पोर्टब्लेयर	21,009	0.97
9	शेर ए कश्मीर कृषि विज्ञान एवं प्रौद्योगिकी विश्वविद्यालय, श्रीनगर	37,630	8.00
10	भाकृअनुप उत्तर पूर्वी पर्वतीय क्षेत्र अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, उमियाम, बारापानी	30,206	11.61
11	पीवीएनआर तेलंगाना पशु चिकित्सा विश्वविद्यालय, वारंगल	10,223	1.81
12	श्री वेंकटेश्वरा पशु चिकित्सा विश्वविद्यालय, तिरूपति	35,483	3.23
कुल		**6,47,194**	**166.65**

Executive Summary

All India Coordinated Research Project on Poultry Breeding

AICRP on Poultry Breeding is being operated at twelve centres viz. KVASU, Mannuthy, AAU, Anand, KVAFSU, Bengaluru, GADVASU, Ludhiana, OUAT, Bhubaneswar, CARI, Izatnagar, ICAR RC for NEH Region, Agartala, NDVSU, Jabalpur, AAU, Guwahati, BAU, Ranchi, MPUAT, Udaipur and CSKHPKVV, Palampur. The main objectives of the project was development of location specific chicken varieties, conservation, improvement, characterization and application of local native, elite layer and broiler germplasm; development of package of practices for village poultry and entrepreneurships in rural, tribal and backyard areas. In addition, KVASU, Mannuthy, AAU, Anand centres to maintain two elite layer germplasm (IWN and IWP). KVAFSU, Bengaluru, GADVASU, Ludhiana, OUAT, Bhubaneswar, ICAR-CARI, Izatnagar to maintain four elite broiler germplasm (PB-1, PB-2, CSML and CSFL).

Two pedigreed random bred control populations (one for layer and the other for broiler) were evaluated and reproduced at ICAR-Directorate on Poultry Research, Hyderabad. Samples of hatching eggs from these populations are being sent to different centres of AICRP on Poultry Breeding to measure the genetic progress. As per the decision taken by the Council, the strains maintained at different AICRP centres and ICAR-DPR were duplicated at various AICRP centres to be utilized in case of exigencies and as a resource population by the centre for production of three and four way crosses. The strains being duplicated at different AICRP centres are IWF at Mannuthy, IWD and IWK at Anand and M-1 and M-2 at Jabalpur. During the year a total of **8,07,869** chicken germplasm was distributed to the farmers from Different Centres with a total revenue generation of **Rs.223.47 lakhs**.

KVASU, Mannuthy centre has evaluated the S-3 generation of native chicken germplasm up to 40 weeks of age. Egg production of native chicken germplasm up to 40 weeks of age was 79.20 eggs which improved significantly by 3.24 eggs from previous generation. The NDR (IWN X Desi X RIR) produced 217.8 eggs up to 72 weeks of age under farm condition. The centre evaluated IWN and IWP strains up to 64 weeks of age in S-30 generation along with layer control population. The hen day egg production up to 64 weeks of age in S-30 generation increased by 3 eggs in IWN and decreased by 4.9 eggs in IWP strains.The genetic response for hen housed egg production up to 64 weeks and egg weight at 64 weeks of age was negative in both IWN and IWP strain in S-30 generation. The centre has generated a revenue of Rs. 35.01 lakhs, which was 131 % of the total expenditure on feed. The centre has distributed a total of 1,33,829 chicken germplasm to the farmers during the year.

AAU, Anand centre evaluated native chicken and White Leghorn lines (IWN, IWP, IWD and IWK) during the year. The egg production up to 40 weeks of age was 66.40 eggs in S-2 generation of native chickens which was lower as compared to S-1 (71.29 eggs). Three way cross (IWN x Native x RIR) was evaluated under farm and field conditions up to 40 weeks of age. The 40 week egg production was 77 and 62 eggs, respectively. Hen housed egg production up to 64 weeks of age was 263.6 and 250.5 eggs in IWN and IWP strains in base generation brought from Mannuthy. The centre has supplied a total of 46,983 chicken germplasm to 1,006 farmers during the year. The centre has generated Rs.26.16 lakhs which was 86% of the expenditure incurred on feed.

KVAFSU, Bengaluru centre, evaluated native chicken, PB-1 and PB-2 and their crosses. The average body weight of day old and 8 weeks of native chicken was 30.37 and 464.9 g, respectively in S-3 generation. The feed efficiency at 0-8 week was 3.15. The overall survivability was 97.16% in 0-8 weeks. The average eighth week body weight of the F2 (PB-1 x Native x PB-2) males and females was 1,255 and 1,106 g, respectively. The FCR (0-8 wks) was 2.72. The body weight at 5 week of age increased in PB-2 and control lines. The average egg production at 40 weeks of age in PB-1, PB-2 and Control lines were 63.81, 61.25 and 63.48 eggs, respectively. The average phenotypic and genetic response of 5 week body weight over 12 generations was 17.90 and 30.04g in PB-1 and 10.40 and 20.44 g, over 13 generations in PB-2, respectively. A total of 1,95,795 germplasm were supplied to 365 farmers. The centre generated a revenue of Rs. 52.34 lakhs which was 169% of expenditure on feed cost.

Ludhiana centre carried out the evaluation of local native chicken (*Punjab Brown*), PB-1 and PB-2 during the year. The body weight of native germplasm at day one, 4 and 8 week of age were 37.74, 370.2 and 765

g, respectively. The egg production up to 40 weeks of PB2 X Desi cross was 58.74 eggs in farm and 55.62 eggs in field. Average body weight at 5 weeks of age was 1,166, 1,071 and 826 g in PB-1, PB-2 and Control lines, respectively. The body weight at 5 weeks of age increased in PB-2 line and decreased in PB-1 and control lines as compared to previous generation. Egg production up to 40 weeks in PB-1, PB-2 and control lines were 64.66, 68.61 and 55.36 eggs, respectively. Genetic response over last 11 generations for 5 week body weight was 20.65 g in PB-1 and 11.52 g in PB-2 population. A total of 1,02,049 germplasm was supplied to 300 farmers. The centre generated revenue of Rs.25.51 lakhs which was 121% of expenditure on feed cost.

ICAR-CARI centre evaluated the local native chicken, CSML, CSFL and their crosses during 2018-19. The body weight of local native chicken germplasm at 6 and 12 weeks was 504.6 and 1,140 g, respectively. Body weight of CSML X Desi birds at 6, 8 and 12 weeks were 1,065, 1,368 and 1,847 g, respectively. The body weight at 5 week maintained in CSML and CSFL and decreased in control line. The FCR at 5 weeks of age in CSML and CSFL was 1.80 and 1.81. The 40 week egg production increased in CSML and CSFL and decreased in control as compared to previous generation. The phenotypic response of body weight at 5 weeks per generation was 14.77 and 14.69 g in CSML and CSFL, respectively. The genetic response was 15.13 and 15.01 g, respectively. Trademark of CARIBRODHANRAJA™ was obtained. A total of 51,388 germplasm was supplied to farmers. Revenue generation was Rs. 8.03 lakhs.

Bhubaneswar centre evaluated *Hansli,* CSML, CSFL and their crosses during the year. The average body weight at day old and 8 weeks of *Hansli* chicken was 32.34 and 587 g. The egg production up to 40 and 50 weeks in *Hansli* (S-2) was 23.14 and 33.25 eggs, respectively. In the current year the body weight at 5 weeks was 1,025 and 1,129 g in CSFL and CSML which improved from the last generation. Egg production up to 40 weeks in CSFL and CSML were 52.39 and 66.45 eggs, respectively. Centre has supplied 18,810 day old chicks to farmers. The centre has generated a revenue of Rs. 4.44 lakhs, which was 31% of total feed cost.

Tripura centre evaluated Tripura Black, *Dahlem Red,* broiler dam line, BN and BND cross. The body weight at 8 weeks was 306.5, 495, 1,102 and 512.9 g and at 20 weeks was 1,116, 1,601, 2,789 and 1,593 g, respectively in Tripura Black, *Dahlem Red,* Coloured broiler dam line and BN cross. Body weights at 8 weeks in BND cross at farm and field were 499 and 403 g, respectively. During E-3 evaluation the 52 week egg production was 94.8 and 82.75 eggs under farm and field conditions, respectively in BND cross. A total of four training programmes on backyard poultry farming for tribal farmers were organized. A total of 25,275 germplasm was supplied to 300 beneficiaries during 2018-19. The centre generated a revenue of Rs. 10.26 lakhs which was 59% of expenditure on feed cost.

Jabalpur centre evaluated G-9 generation of *Kadaknath* and Jabalpur colour (JBC) populations up to 52 weeks of age. *Narmadanidhi* birds were evaluated in farm and field up to 52 weeks of age. The 6 week body weight was 343.3 and 803.7g in *Kadaknath* and JBC population, respectively. The hen housed egg production up to 40 weeks of age was 91.9 eggs in JBC and 57.3 eggs in *Kadaknath*. *Narmadanidhi* produced 49, 88 and 176 eggs up to 40, 52 and 72 weeks, respectively in field conditions. The egg production increased both at farm and field conditions. A total of 56,432 germplasm was supplied to 184 beneficiaries. The centre generated a revenue of Rs. 20.67 lakhs which was 116% of expenditure on feed cost.

Guwahati centre evaluated native, *Dahlem Red,* PB-2 and *Kamrupa* populations during the year. The 5 weeks body weight was 132.5g in native, 1,165 g in PB-2 and 360.2g in *Dahlem Red*. The egg production up to 52 weeks was 67.50 eggs in native population. The 52 week egg production in *Dahlem Red* was 120.6 egg which improved by 3.1 eggs from the last generation. In *Kamrupa*, the 5 weeks body weight was 250.5 and 210.6 g in the farm and field, respectively. The egg production up to 40 and 52 weeks of age was 49.20 and 90.40 eggs in the farm and 43.60 and 73.70 eggs in the field conditions, respectively. The centre supplied 30,720 germplasm to farmers. The centre realized receipt of Rs. 6.26 lakhs which was 52% of expenditure on feed cost.

Ranchi centre evaluated native chicken, *Dahlem Red,* PB-2 and their cross, *Jharsim*. The body weight at 20 weeks of age was 989.2 in native and 1,218 g in *Dahlem Red*. The 40 week egg production was 32.33 and 45.38 eggs in native and *Dahlem Red* birds, respectively. The body weight at 20 weeks of age

was 1,791 g in males and 1,554 g in females. Centre supplied 25,323 germplasm to the farmers. The centre generated a revenue of Rs. 6.70 lakhs which was 87% of expenditure on feed cost.

Udaipur centre evaluated *Mewari*, RIR, CSFL, BN and BNR populations. The eight week body weight was 640.9 in *Mewari*, which increased from the last generation. The egg production up to 52 weeks of age was 69.23 in *Mewari*. The egg producton up to 40, 52 and 72 weeks were 62.3, 100.4 and 166.1 eggs, respectively in *Pratapdhan* during E-7. The egg production showed a decreasing trend from the last generation. A total of 76,681 chicken germplasm was supplied during the current year. The centre realized a receipt of Rs. 14.90 lakhs which was 95% of expenditure on feed cost

Palampur centre evaluated native, *Dahlem Red* and *Himsamridhi* chicken during the year. The body weight at 8 weeks of age was 530.3 and 617.1 g in native and *Dahlem Red*, respectively. The egg production up to 52 weeks of age was 84.31 eggs in native and 148.35 eggs in *Dahlem Red*. The egg production showed improvement in native and DR populations as compared to previous year. The annual egg production (72 weeks) of *Himsamridhi* was 145.65 eggs under field conditions. During the year, the centre supplied 44,584 chicken germplasm to 631 farmers in Himachal Pradesh. The centre realised receipts of Rs 13.19 lakhs which was 70% of expenditure on feed cost.

Germplasm distribution and revenue generation during 2018-19

Centre	Germplasm (Nos.)	Revenue (Rs. in Lakhs)
KAVSU, Mannuthy	1,33,829	35.01
AAU, Anand	46,983	26.16
KVAFSU, Bengaluru	1,95,795	52.34
GADVASU, Ludhiana	1,02,049	25.51
OUAT, Bhubaneswar	18,810	4.44
ICAR-CARI, Izatnagar	51,388	8.03
MPUAT, Udaipur	76,681	14.90
NDVSU, Jabalpur	56,432	20.67
AAU, Guwahati	30,720	6.26
CSKHPKVV, Palampur	44,584	13.19
BAU, Ranchi	25,323	6.70
ICAR-RC, Agartala	25,275	10.26
Total	**8,07,869**	**223.47**

Poultry Seed Project

The "Poultry Seed Project" was evolved with an objective to increase the availability of rural chicken germplasm in remote areas of our country. In this endeavour, the Indian Council of Agricultural Research has initiated "Poultry Seed Project" during the XI five year plan with six centres, three in the northeast region and three in different state veterinary/agricultural universities. The project has been strengthened during the XII plan by adding five more centres to cater to needs of the farmers in their respective regions. At present, the project is being operated at 12 centres across the country. The main objective of this project is local production of improved chicken germplasm (fertile eggs, day old chicks and grownup chicks) and supply to various stake holders in the remote areas to target production enhancement of egg and meat for augmenting rural poultry production, socio-economic condition of the target groups and linking small scale poultry producers with organized market.

The PSP centres are located at West Bengal University of Animal and Fishery Sciences, Kolkata; Bihar Animal Sciences University, Patna; ICAR Research complex for NEH region, Nagaland regional centre, Jharnapani; ICAR–National Organic Farming Research Institute, Gangtok; ICAR Research complex for NEH region, Manipur regional centre, Imphal; Tamil Nadu Veterinary and Animal Sciences University, Hosur; ICAR-Central Coastal Agricultural Research Institute, Panaji; ICAR-Central Island Agricultural Research Institute, Port Blair; Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar; PVNR Telanagna Veterinary University, Warangal; Sri Venkateswara Veterinary University, Tirupati and ICAR Research Complex for NEH Region, Umiam.

The Directorate as a coordinating unit, supplies parent chicks, co-ordinates and monitors the activities of different centres to enable them to achieve the set targets for each centre. The target set for supplying chicks for mainland and north-east centres during the year were between 0.3 and 1.0 lakhs chicks per annum for different centres and to collect feedback on the performance of the germplasm under backyard farm conditions. A total of **6,47,194** improved chicken varieties have been distributed in their respective regions/states with a revenue receipts of **Rs. 166.65** lakhs during the year.

Eight batches of *Vanaraja* parents were reared during the year at Kolkata centre, out of which, five are in laying and three batches were culled after the end of economic laying. The egg production of 50% was achieved at 31 weeks and maintained up to 67 weeks. Fertility ranged from 86.28% to 91.16%. Hatchability on total eggs set (TES) and fertile eggs set (FES) was consistent throughout the life cycle reaching up to 81.52% (TES) and 88.32% (FES). A total of 92,848 *Vanaraja* chicks were distributed to the farmers in various parts of West Bengal during the year. The total revenue generated was Rs. 17.92 lakhs.

Two batches of *Vanaraja* parents were reared at Patna Centre. The average age at sexual maturity was 180 days in *Vanaraja* female parents. The HDEP in *Vanaraja* at 36 weeks of age was 51.35% with an egg weight of 50.88 g. The average fertility percentage was 78.27 and the average hatchability on TES and FES was 68.37% and 72.54%, respectively in *Vanaraja* female line. A total of 69,179 *Vanaraja* chicken germplasm was distributed to the farmers in Bihar during the year with an amount of Rs. 12. 03 lakhs revenue.

A total of 2042 parents of *Vanaraja* and *Srinidhi* were in position at present in Jharnapani centre. The production of 50% was attained at 36 weeks of age in *Vanaraja* parents. The overall fertility rate was 73.58% and 81.9% in *Vanaraja* and *Srinidhi* female lines respectively. The overall hatchability on fertile eggs set was 70.11% in *Vanaraja* and 69.66% in *Srinidhi* parents, respectively. A total of 83,508 improved chicken germplasm was distributed to farmers of Nagaland and neighbouring states during the year. A total of Rs. 33.33 lakhs revenue was generated at Jharnapani Centre. The centre achieved the target of germplasm.

Two batches of *Vanaraja* parents were reared at ICAR-NOFRI, Gangtok, Sikkim. The average HDEP in *Vanaraja* was 51.74 (24-72 weeks) during the year. Peak production (72%) was attained at 31-34 weeks of age. The average fertility and hatchability (TES) rates in *Vanaraja* female line were 87.53 and 78.83%, respectively. A total of 89,495 improved chicken germplasm of *Vanaraja* was distributed to 3,371 farmers covering 667 village habitats in Sikkim with an amount of Rs. 16.77 lakhs revenue. The centre achieved the set target of germplasm.

Three batches of *Vanaraja, Gramapriya* and *Srinidhi* parents were reared at Manipur Centre during the year. The average HHEP was 18.57% (55-72 weeks) in *Vanaraja* and 32.7% (24-72 weeks) in *Srinidhi* parents. The average fertility was 80.65 and 86.06% in *Vanaraja* and *Srinidhi* parents, respectively. The hatchability on TES was 58.05% in *Vanaraja* and 66.73% in *Srinidhi* parents. A total 79,425 improved chicken germplasm was distributed to the farmers in Manipur. The Centre has generated Rs. 22.4 lakhs of revenue during the year. The centre achieved the targeted germplasm supply.

Four batches of *Vanaraja* and three batches of *Gramapriya* parents were reared at Hosur Centre during the reporting period. The HDEP ranged from 69 to 52% during 42 – 72 weeks of age and HHEP of 175 at 72 weeks of age in *Vanaraja* (III batch). Similarly, the HDEP ranged from 86 to 64% during 23 – 72 weeks of age with HHEP of 191 at 72 weeks of age in *Gramapriya* (III batch). The average fertility was 88.33% (42-72wks) in *Vanaraja* and 87.65% (28-72 wks) in *Gramapriya*, respectively. A total of 1,42,674 improved rural chicken (*Vanaraja* and *Gramapriya*) germplasm was distributed to 1,248 farmers in Tamil Nadu. The Centre has generated total revenue of Rs. 36.03 lakhs during the year. The centre has achieved the targeted germplasm supply.

One batch of *Srinidhi* parents were reared at Goa during the year. The body weight of female and male parent of *Srinidhi* was 1271 and 3042 g, respectively. A total of 1,357 improved chicken germplasm was distributed to 42 farmers in Goa with a revenue of Rs. 2,27,708.

Two batches of *Vanaraja* parents were reared under deep litter system at Port Blair. The age at sexual maturity (ASM) was 178 days in *Vanaraja* female line. HDEP was highest (37.87%) in 40th week of age. A total of 21,009 improved chicken germplasm were distributed to 246 farmers in Andaman & Nicobar Islands with revenue of Rs. 97,250 during the year.

Two batches of *Vanaraja* and *Srinidhi* parents were reared at ICAR-RC for NEH Region, Umiam, Barapani. The HDEP at 52 weeks of age was 33.5% in *Vanaraja* and 27% in *Srinidhi* parents. The fertility and hatchability (TES) ranged from 79-87 and 61-75%, respectively in *Vanaraja* parents and were 79-83 and 56-62% in *Srinidhi* parents, respectively. A total of 30,206 improved chicken germplasm was distributed

to the farmers in Meghalaya with an amount of Rs. 11.61 lakhs of revenue during the year.

Two batches of *Vanaraja* breeders were reared during the year at Srinagar. The age at first egg was 170 days. The average egg production was above 60% (59-62%) from 56 weeks to 72 weeks of age. The average hatchability on total egg set was 60.11% in *Vanaraja* parents. A total of 37,630 *Vanaraja* germplasm was distributed to farmers of Jammu and Kashmir.

One batch of *Vanaraja* parents were maintained at SVVU, Tirupati, Andhra Pradesh. A total of 8,763 chicks were supplied to the farmers and generated Rs. 3.23 lakhs as revenue by sale of chicks and eggs during the period.

Two batches of *Vanaraja* and *Gramapriya* parents were reared at PVNRTVU, Warangal, Telangana during the reporting period. The ASM was 142 days (20th wk) in *Vanaraja* female line. The highest egg production (67.38%) was recorded at 46th week of age in the entire laying cycle. The average HDEP was 41.5 (28-52 weeks). The average fertility was 83.67% (24-51 wks) in *Vanaraja* parents. A total of 10,223 improved rural chicken (*Vanaraja*) germplasm was distributed to the farmers. The centre has generated total revenue of Rs. 1.81 lakh during the year.

Centre wise distribution of germplasm under Poultry Seed Project

Centre	Germplasm (Nos.)	Revenue (Rs. in lakhs)
WBUAFS, Kolkata	92,848	17.92
BASU, Patna	69,179	12.3
ICAR-RC, Jharnapani	83,508	33.33
ICAR-NOFRI, Gangtok	89,495	16.77
ICAR-RC, Imphal	79,425	22.41
TANUVAS, Hosur	1,42,674	36.03
ICAR-CCARI, Goa	1,220	2.27
ICAR-CIARI, Port Blair	21,009	0.97
SKUAST, Srinagar	37,630	8.00
ICAR-RC for NEHR, Umiam	30,206	11.61
PVNRTVU, Warangal	10,223	1.81
SVVU, Tirupati	35,483	3.23
Total	**6,47,194**	**166.65**

Budget

AICRP on Poultry Breeding (2018-19) **(Rs. in lakhs)**

AICRP Centre	Actual budget released (ICAR share)	Budget (State share)	Total expenditure	Expenditure on feed	Receipts
KVASU, Mannuthy	61.65	20.55	82.20	26.80	35.01
AAU, Anand	54.50	18.17	72.67	30.29	26.16
OUAT, Bhubaneswar	56.23	18.74	74.97	14.12	4.44
GADVASU, Ludhiana	48.00	16.00	64.00	22.80	25.51
KVAFSU, Bengaluru	56.00	18.67	74.67	30.94	52.34
MPPCVV, Jabalpur	64.15	21.38	85.53	17.90	20.67
ICAR RC NEH, Agartala	29.00	-	29.00	17.40	10.26
AAU, Guwahati	59.75	19.92	79.67	12.09	6.26
CSKHPKV, Palampur	66.25	22.08	88.33	18.90	13.19
BAU, Ranchi	54.75	18.25	73.00	7.68	6.70
MPUAT, Udaipur	68.88	22.96	91.84	17.64	14.90
ICAR-CARI, Izatnagar	-	-	-	-	8.03
Total	**619.16**	**196.72**	**815.88**	**216.56**	**223.47**

Poultry Seed Project **(Rs. in lakhs)**

Seed centre	SFC (2017-20)	Budget released (2018-19)	Expenditure	Receipt if any,
WBUAFS, Kolkata	124.13	49.50	49.50	17.92
BASU, Patna	132.96	38.00	38.00	12.3
ICAR-RC, Jharnapani	167.09	51.25	51.25	33.33
ICAR-NOFRI, Gangtok	158.13	45.25	45.25	16.77
ICAR-RC, Imphal	135.67	40.25	40.25	22.41
TANUVAS, Hosur	117.92	51.95	51.95	36.03
ICAR-CCARI, Goa	107.25	44.50	44.50	2.27
ICAR-CIARI, Port Blair	107.25	31.50	31.50	0.97
SKUAST, Srinagar	105.42	26.00	26.00	8.00
ICAR-RC for NEHR, Umiam	226.23	67.25	67.25	11.61
PVNRTVU, Warangal	146.26	58.00	58.00	1.81
SVVU, Tirupati	141.19	62.86	62.86	3.23
Total	**1669.5**	**566.31**	**566.31**	**166.65**

AICRP on Poultry Breeding

History

The Directorate of Poultry Research had a modest beginning during the IV five year plan with two coordinated projects entitled "All India Coordinated Research Project on Poultry for Egg" and All India Coordinated Research Project on Poultry for Meat" to evolve suitable strains of egg and meat type chicken that combine well for production of commercial layer and broiler crosses. Both these projects were merged into a single project namely "All India Coordinated Research Project on Poultry Breeding" during the V plan.The 'Rural Poultry' component of the project was initiated with one centre at Agartala in 2001. Subsequently it was expanded to six centres during XI plan with the sole objective of development of location specific rural poultry varieties. This was elevated to the status of a Project Directorate during the VII plan period.

The head quarter of the Project Directorate on Poultry was established at Andhra Pradesh Agricultural University Campus, Rajendranagar, Hyderabad with effect from 1st March, 1988. Coordination and monitoring had been assigned to the Directorate (Coordination Cell) to start with. Subsequently, Nucleus Stock Production Unit as a centre of AICRP on Poultry Breeding was established at the Project Directorate for multiplication and supply of the parents and their commercial crosses released from the project centres. The Directorate had been entrusted with additional responsibilities of maintenance, evaluation, production and supply of control populations of egg and meat to the centres from 1st April, 1990. Maintenance of layer and broiler control populations previously maintained at HAU, Hissar and UAS, Bangalore respectively was assigned to this Directorate w.e.f. 1.4.1990. The Directorate had been entrusted with the evaluation of commercial layers and broilers developed at different centres of the project vis-à-vis those available in the market from other hatchery sources and maintenance of the elite stocks of layers and broilers available in the country/ to be imported from abroad in future and to undertake their genetic description and characterisation with respect to bio-chemical, immunological and cytogenic traits and resistance to diseases. Research was also envisaged in the areas of poultry nutrition, poultry housing and management, and poultry health. Identification of alternative feed resources and their chemical and biological evaluation and development of least cost poultry ration was the priority of poultry nutrition research. In the discipline of poultry housing and management, biological efficiency of different management practices for economic poultry raising was intended to be determined. Surveillance and monitoring of poultry diseases and development of kits for quick diagnosis of diseases was proposed to be the main objective of poultry health research. Currently the Directorate is operating its research programmes within the frame work of the approved Perspective Plan. During the year 2014-15 the Project Directorate on Poultry has been upgraded to Directorate of Poultry Research

Objectives

During the year 2014-15, AICRP on Poultry Breeding was reoriented towards Rural Poultry. Therefore for the current year the objectives of AICRP on Poultry Breeding are as follows.

1. To develop location specific chicken varieties and their dissemination for village poultry.
2. Conservation, improvement, characterization and application of local native and elite layer and broiler germplasm.
3. To develop package of practices for village poultry and entrepreneurships in rural, tribal and backyard areas etc.

Location of the centres

AICRP on Poultry Breeding

Sl. No.	Name of the Centre	Period
1.	Anand Agricultural University, Anand	06-07-1977 to 31-03-2020
2.	Kerala Veterinary and Animal Science University, Mannuthy	19-02-1977 to 31-03-2020
3.	Karnataka Veterinary, Animal and Fishery Sciences University, Bengaluru	14-01-1970 to 31-03-2020
4.	Central Avian Research Institute, Izatnagar	01-04-1970 to 31-03-2020
5.	Guru Angad Dev Veterinary and Animal Science University, Ludhiana	26-02-1977 to 31-03-2020
6.	Orissa University of Agriculture and Technology, Bhubaneswar	21-01-1971 to 1990 and 01-09-1991 to 31-03-2020
7.	ICAR Research Complex for NEH region, Agartala	01-08-2001 to 31-03-2020
8.	Nanaji Deshmukh Veterinary Science University, Jabalpur	11-06-1970 to 31-03-2020
9.	Assam Agricultural University, Guwahati	23-03-2009 to 31-03-2020
10.	Birsa Agricultural University, Ranchi	23-03-2009 to 31-03-2020
11.	Maharana Pratap University of Agriculture & Technology, Udaipur	23-03-2009 to 31-03-2020
12.	CSK Himachal Pradesh Krishi Viswavidyalaya, Palampur	23-03-2009 to 31-03-2020
13.	ICAR-Directorate of Poultry Research, Hyderabad	

*Control Population Unit

Monitoring role of the coordinating unit/Directorate

1. Organization of Review Committee meeting/Scientists meet/Workshops
2. Compilation of periodical reports received from individual centres for submission to ICAR and preparation of Annual Report
3. Verification and scrutiny of proposals received from different centres in all aspects relating to budget, release of funds and in all other matters relating to the functioning of various centres and their onward transmission to ICAR
4. Preparation of EFC proposals.
5. Preparation of DARE's Report and Research Highlights
6. Compilation of report for answering the parliament questions
7. Visit to different centres of the project for review of progress

Technical Program

Technical Programme in brief for the year 2018-2019

- Pedigreed hatching and evaluation of the local native chicken.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition and for development of cross.
- Production and evaluation of direct cross of local native birds with improved germplasm.
- Development and evaluation of terminal cross (location specific germplasm)

Development of crosses

On the basis of survey a decision is to be taken about the type of chicken to be developed by the centre

For dual type chicken

CB/ Improved broiler germplasm X Local native

↓

(Farm) Evaluation of F1 --- (F1) X RIR/ DR --- and crossing with improved line

(50% Imp Ger pl + 50% Local native)

↓

Crossbred Evaluation under farm & field conditions (25% Imp Ger pl + 25% Local native + 50% RIR/ DR)

↓

Repeat of the above

↓

Selection of parental populations

A) For egg type chicken

Improved egg type breed/ line (RIR/ DR) X Local native

↓

(Farm) Evaluation of F1 --- (F1) X RIR/ DR --- and crossing with improved line

(50% Imp Germ pl + 50% Local native)

↓

Crossbred Evaluation under farm & field conditions (25% Local native + 75% RIR/DR)

↓

Repeat of the above

↓

Selection of parental populations

B) For meat type chicken

Improved meat type breed/ line (CB/ PD_2) X Local native

↓

(Farm) Evaluation of F1 --- (F1) X CB/ PD_2 --- and crossing with improved line

(50% Imp Ger pl + 50% Local native)

↓

Crossbred Evaluation under farm & field conditions (25% Local native + 75% CB/PD2)

↓

Repeat of the above

↓

Selection of parental populations

NB: RIR – *Rhode Island Red;* DR – *Dahlem Red*; CB – Control Broiler; PD-2 -- Coloured synthetic female broiler line

Flocks to be selected for Rural Poultry

- Local native chicken (with better phenotypic performance) in the respective agro-climatic zones (preferably with similar phenotypic appearance).
- Improved egg type or meat type chicken developed by ICAR/ SAUs to be procured.

Selection of native birds (Egg type)

- Collection of about 300 females and 60 males initially
- Production of 1000 chicks by random mating
- Subsequent generations – To produce 1500 chicks utilizing 50 sires, 250 dams
- At the time of housing – To select **500** pullets, **150** males
- Primary trait – 40 wks egg production
- Pedigreed mating of the native chicken

Recording of traits

- Body Weight at 20 and 40 wks
- ASM
- Egg weight at 28, 40 wks
- Egg production to 72 weeks
- Mortality: 0-6, 7-20, 21-40 and 41-72 wks
- Field Evaluation of about 250 birds under backyard/free range

Selection of native birds (Meat type)

- Collection of about 300 females and 60 males initially
- Production of 1000 chicks by random mating
- Subsequent generation – To produce 1500 chicks utilizing 50 sires and 250 dams
- Selection for 8 wk body weight – To select 600 females, 250 males
- At the time of housing – **500** pullets, **150** males

Recording of trait

- BW at day old, 4, 6, 8, 12, 20 and 40 wks
- ASM
- EW at 28, 40 wks
- EP to 40 weeks
- Mortality – 0-6, 7-20, 21-40 wks

Field Evaluation of about 250 birds under backyard/ free range and collection of data

Conservation of elite germplasm

A. Technical programme for layers

1. Layer centres will work on maintenance of elite layer populations.
2. Collection, characterization and conservation of local native germ plasm.
3. Production and evaluation of crosses under farm and field conditions.
4. Development of location specific varieties.
5. Impact assessment
6. The strains that are being maintained at present will be continued. IWH, IWI, IWD, IWF and IWK will be maintained at ICAR-DPR, Hyderabad. IWN and IWP, strains will be maintained since they have been identified as most promising, lines. IWG, IWJ and will be maintained by the respective centre on a small population size.
7. To maintain the pure line performance, the selection programme currently under progress in the AICRP will be continued with lesser intensity of selection. The entire flock of each population will be maintained till 64 weeks of age. The following traits will be measured:

   i) Age at first egg

   ii) Body weight at 16, 40 and 64 weeks of age.

   iii) Egg weight at 28, 40 and 64 weeks of age.

   For those populations having low egg weight, the first ten eggs also need to be measured.

   iv) Egg production to 40 and 64 weeks of age and computation of egg production on hen housed and hen day basis.

   v) A random sample of 100 eggs will be utilized at 40 weeks of age to measure albumen height and index, yolk height and index and shell thickness and Haugh unit score. The percentage of blood and meat spots will also be recorded.

   vi) Percent fertility and percent hatchability on total and fertile eggs set will be measured. The minimum expectation will be more than 90% fertility and 80% hatchability (FES).

   vii) Mortality during the following periods:

   a) 0-8 weeks b) 9-16 weeks c) 17-40 weeks d) 41-64 weeks e) 17-64 weeks

   The minimum expectation will be less than 6% mortality during 0-8 weeks. Less than 5% mortality during 9-16 weeks. Less than 1% mortality per month during the period 17-64 weeks in the layer house.

   viii) Among the selected breeders, three eggs from each female will be broken for measuring the shell thickness. Breeders with very thin shell eggs will be replaced by breeders with better egg shell thickness before the mating are arranged.

8. All centres will maintain all the surviving birds of first hatch to record egg production till 72 weeks of age.
9. Only **350** females and **50** males will be selected from each population to reproduce next generation (only by artificial insemination). It is expected that in four hatches of 10 days interval, a total of **1400** female chicks and 500 male chicks will be hatched for each population.
10. A total of at least **600** pullets for each population will be housed at 16 weeks of age in individual laying cages for generating the traits mentioned above at item no. 2. The desired number of males will have to be housed for each population.
11. Only **300** males will be retained at 16 weeks of age at the rate of two males per dam family. They may

be housed either in cages or on deep litter in floor pens depending on the available facilities (all care should be taken to prevent mortality in the males, saved at 16 weeks, as it will affect the selection differential from the male side and also the average selection differential).

12. The hen housed egg production up to 64 weeks of age will be the criterion of selection.

13. The selection will be practiced in both the sexes for 64 weeks, hen housed egg production, and 28 weeks egg weight. Selection for egg production will be carried out on the basis of an index that takes into account individual production and its sire and dam family averages (Osborne, 1957 a and b). The selection for egg weight, obtained at 28 weeks, will be utilized as independent culling level selection to be superimposed over the selection for 64 weeks egg number. For giving due weightage to viability, in selection programme only hen housed family average need to be used in computation of Osborne index values.

14. Based on the index values, only 450 pullets will be selected on the basis of egg production. Out of these 450 pullets, based on the low early egg weight and shell thickness, 100 pullets will be rejected. Thus, finally only **350** pullets and 50 males will be selected which are good for egg production having better egg weight and with good shell thickness.

15. The chicks will be sexed at hatching, in all layer populations and 1400 females and only **500** males at the rate of 18 males per sire family will be saved. All male chicks will be dubbed.

16. All centres will keep a sample of layer control females hatched from the hatching eggs received from ICAR-Directorate of Poultry Research (at least 200 females will have to be housed at 16 weeks of age). They will also be evaluated along with the selected populations.

17. Uniform reporting of the data by all the centres.

18. Maximum publicity through media for popularizing high yielding strains/ varieties developed by AICRP on Poultry Breeding.

19. Each centre will record rate of lay and persistency of peak production will be recorded.

20. The layer control will be supplied by ICAR-DPR to all the centres.

Programme for Layer Control population

The technical programme currently under progress for control populations for egg will be continued. Each population will be reproduced using 50 sires, each sire mating to 4 dams and 4 progeny per dam are to be studied for various growth, production and reproduction traits. In order to obtain 4 progeny for each dam at the time of housing the suitable numbers of chicks are to be hatched.

The following traits are to be measured in case of layer control population.

1. Body weight at 16, 40 and 64 weeks of age
2. Age at first egg
3. Egg weight at 28 and 40 weeks of age
4. Egg production to 40 weeks of age and 64 weeks of age
5. Percent fertility and hatchability on total and fertile eggs set
6. Egg quality traits like albumin index, yolk index, shell thickness and percentage blood and meat spot on a sample of 100 eggs at 40 weeks of age.
7. Mortality during the following period 0-8 weeks, 9-16 weeks and 17 to 40, 40-64 and 17-64 weeks.
8. About 500 eggs are to be supplied to each egg centre from the Project Directorate for evaluation of environmental trends.

B. Technical programme for Broilers

Development of sire and dam line population

1. Broiler centres will work on maintenance of elite broiler populations.
2. Collection, characterization and conservation of local native germ plasm.
3. Production and evaluation of crosses under farm and field conditions.
4. Development location specific varieties and impact assessment
5. The centres will continue to develop the existing female line available with them.
6. Centres involved in development of dam line population will produce **3,500** chicks each generation.
7. It is expected that at least **3000** chicks will contribute to data at 5 weeks for making necessary selection.

8. Between 5th and 6th week, a total of **1200** females will be selected based on 5 week body weight.
9. A total of 250 best males will also be selected on body weight at 5 week.
10. At the age of 12 weeks a physical selection will be taken up and **1000** females without any physical defects will be retained and **200** males will also be retained after screening them for satisfactory physical appearance.
11. About 500 females will be housed in individual cages.
12. Simultaneously, **150** best males out of the 200 males will also be housed in cages or on deep litter.
13. The females will be evaluated for dam line traits till the time the youngest hatch attains 40 weeks of age and sire family selection will be practiced.
14. Out of the surviving females, a total of **350** females will be selected and will be mated to **70** best males selected from the available 200 males housed at 18 weeks of age to obtain replacement progeny (The artificial insemination is mandatory to reproduce the next generation so as to ensure high percentage fertility and good number of chicks).
15. It is estimated that in 4 to 5 hatches of 7 to 10 days interval, the required number of chicks can be reproduced from the 350 selected female breeders mated to 70 selected male breeders.
16. The criterion of selection, for the females, will be the sire means for settable egg production. Similarly, the males from the sire families from which females have been chosen will be selected as male parents.
17. The shape index of the eggs needs to be measured at 32 weeks of age by measuring the length and width of egg. It is desirable to measure the shape index for five consecutive days. The acceptable shape index is suggested as 1.30 to 1.50.

Restriction programme : Since the birds are selected at 5 weeks of age, a graph has to be generated assuming a target body weight of 2150 to 2200g at 20 weeks of age in dam line and 2400g at 20 weeks in sire line. Assuming linearity, a graph has to be developed starting from the mean weight of the selected birds at 5 weeks of age and the expected body weight at bi-weekly interval need to be identified as applicable to populations at each centre. The trend of the body weight at different ages during the restriction program needs to be plotted along with the expected line. The feed need to be increased or retained the same according to the adjustment needed for matching with the proposed graph. The allowance arrived, as per the graph, at different ages can be increased by 10 percent in case of males for achieving similar trend of body weight during the restriction period.

Feed formulation: To keep the nutrient content uniform at all the centres, the following recommendations are given.

ICAR-DPR, Hyderabad

1. This centre will maintain the pure lines that are being withdrawn from different centres as nucleus stock.
2. Regeneration and supply of control population to different centres for evaluation of selected lines.

Programme for Broiler Control population

The technical programme currently under progress for control populations for meat will be continued. Each population will be re-produced using 50 sires, each sire mating to 4 dams and 4 progeny per dam are to be studied for various growth, production and reproduction traits. In order to obtain 4 progeny for each dam at the time of housing the suitable number of chicks is to be hatched.

In case of broiler control population the following traits are to be measured:

1. Body weight at day old, 5, 20 and 40 weeks of age
2. Feed consumption to 5 weeks of age
3. Age at first egg
4. Egg production to 40 weeks of age
5. Egg weight at 40 weeks of age
6. Per cent fertility and hatchability on total and fertile eggs set
7. Mortality during the following periods 0-5 weeks, 6-20 weeks, 21-40 weeks
8. Restricted feeding programme is to be practiced from 6 to 20th week.

About 300 to 400 hatching eggs of Control line are to be supplied to each of the broiler centres of the ICAR-Directorate of Poultry Research during their hatching season, for evaluation of environmental trends.

Nutrient requirement for broiler lines

Nutrient	Chicks 0-5 weeks	Growers 6-18 weeks	Pre-breeders 19-23 weeks	Breeders 24-54 weeks
Energy (K.cal/kg)	2800-2850	2750-2800	2750-2800	2800
Crude Protein (%)	20	16	16	17
Lysine (%)	1.00	0.80	0.80	0.75
Methionine (%)	0.52	0.41	0.41	0.35
Ca (%)	1.0	1.0	2.00	0.1- 3.5
Phosphorus (%)	0.45-0.50	0.45	0.45	0.45
Choline Chloride 50% (%)	0.1	0.1	0.1	0.1
Sodium Chloride	0.4	0.4	0.4	0.4

Native Chicken

Genetic improvement of Native chicken for body weight as well as egg production may be practiced for bringing faster genetic gain in the terminal crosses.

Selection criteria: **Mass Selection** for higher 16 week body weight and **independent culling level** for 40 week egg production

- Regeneration in pedigreed mating with 50 sires and 250 dams
- Production of about 1500 chicks
- Selection for body weight at 16 weeks: Mass Selection
- About 400-500 females and 200-250 males will be housed
- Selection for egg production at 40 weeks: Independent Culling Level
- About 250 dams and 50 sires will be selected as parents for next generation

If demand is there for new type of variety (cross) the centre should conduct survey and establish the need for second variety before starting the work. The Centres are strictly instructed to start the work only after the approval of the competent authority.

Kerala Veterinary and Animal Sciences University, Mannuthy

Programme activity assigned

- Conservation, characterization and improvement of the native chicken germplasm collected from the field.
- To maintain all the surviving birds of first hatch to record egg production till 72 weeks of age.
- To participate with IWN x IWP cross in RSPP tests being conducted by Govt. of India each year.
- To produce and evaluate crosses with native chicken under farm and field conditions.
- To develop location specific chicken varieties and their dissemination for village poultry.

Action taken

- The native chicken completed testing up to 40 weeks of age in S-3 and S-4 generation up to 16 weeks of age.
- 622 female birds of IWN strain and 753 female birds of IWP strain in S-30 generation were evaluated up to 64 weeks of age.
- IWN X Native (ND) was produced and evaluated up to 72 weeks and the cross of ND male with RIR female (NDR) have been produced and evaluated in farm condition up to 72 weeks of age.
- The IWN X IWP birds, native chicks and their crosses were supplied to farmers and institutions.

Achievements

A. Development of location specific rural germplasm (egg type)

Production traits of native chicken

A population of native chickens of S-3 generation was evaluated up to 40 weeks of age and S-4 generation up to 16 weeks of age. Its production performance is presented in Table 1 and 2, respectively. Hen housed egg production up to 40 weeks of age has improved significantly in S-3 generation by 3.24 eggs.

Fertility and hatchability

S-4 generation of native chicken was produced by pedigree mating. The number of sires and dams used for breeding was 50 and 250. Good fertility and hatchability rates were observed in native birds in S-4 generation as well (Table 3).

Growth traits

Results of body weight recorded at various intervals of both male and female birds, ASM and egg weight recorded at 28 and 40 weeks of age is presented in Table 4. Body weights at 8 and 16 weeks of age in both male and females increased in S-4 generation over S-3. The egg weight reduced marginally at 28 weeks and increased by 0.9g at 40 weeks in S-3 generation (Table 4).

Mortality in native birds

Less mortality was observed during 0-8 and 9-16 weeks of age in S-4 generation. In S-3 generation, mortality was higher during 17-40 weeks of age and it was due to Marek's disease outbreak (Table 5).

Heritability estimates

The heritability estimates for ASM, body weight at 16 and 40 weeks and EW at 28 and 40 weeks were high in magnitude and low for egg production (Table 6).

Table 1. Growth and production performances of native chicken (S-3 generation)

Traits	N	Mean ±SE
Body weight (g)		
Day old	50	31.7±0.37
4 wks	205	260.4±18.99
8 wks	580	408.1±3.68
16 wks	599	881.6±4.16
40 wks	422	1318±21.5
ASM (d)	461	154.2±0.36
Egg weight (g)		
28 wks	506	39.30±0.15
40 wks	422	43.37±0.19
Egg production (17-40 wks) Nos.		
Hen housed	530	79.20±1.12
Hen day	-	82.33
Survivor	467	84.90±0.95

Table 2. Body weights (g) in of native chicken (S-4 generation)

Age	Female		Male	
	N	Mean ±SE	N	Mean ±SE
Day old	200	28.47±0.21	52	27.37±0.42
4 wks	224	168.4±1.93	49	171.3±4.63
8 wks	176	456.5±6.29	79	577.5±11.79
12 wks	169	633.1±9.34	103	854.7±16.27
16 wks	620	917.3±4.95	131	1248±15.19

Table 3. Summary of Incubation records for last three generations of native chicken

Gens.	No. of hatches	Eggs set (Nos.)	Infertile eggs (Nos.)	Fertility (%)	Total chicks (Nos.)	Dead germs (Nos.)	Good chicks (Nos.)	Hatchability (%)	
								TES	FES
S-2	2	2780	167	93.99	2520	228	2507	90.60	98.75
S-3	2	3275	326	90.04	2780	181	2723	84.89	94.27
S-4	**3**	**4196**	**348**	**91.71**	**3533**	**315**	**3505**	**84.20**	**91.81**

Table 4. Mean body weights, ASM and egg weights of native chicken

Traits	Females			Males		
Gen.	**S-4**	**S-3**	**S-2**	**S-4**	**S-3**	**S-2**
Body weight (g)						
0 day	**28.47**	31.7±0.37	28.1±0.18	**27.37**	32.43±0.40	28.5±0.18
4wks	**168.4**	260±18.9	259±1.5	**171.3**	248±21.2	282.4±2.8
8 wks	**456.5**	408±3.7	540±2.95	**577.5**	504±10.4	667±5.03
16 wks	**917.3**	882±4.2	986±15.5	**1248**	1225±9.2	1289±22.2
ASM (d)		154.2±0.4	156.8±1.53	-	-	-
Egg weight (g)						
28 wks	-		39.64±0.16	-	-	-
32 wks	-		40.78±0.16	-	-	-
40 wks	-		42.47±0.23	-	-	-

Table 5. Mortality records for native chicken (S-3)

Generation	0-8 wks		9-16 wks		17-40 wks	
	No. Housed	Mortality (%)	No. Housed	Mortality (%)	No. Housed	Mortality (%)
S-2	1596	2.00	1449	0.14	817	7.30
S-3	1675	2.10	1583	1.50	**530**	**13.02**
S-4	**1559**	**0.89**	**1319**	**1.28**	-	-

Table 6. Heritability estimates of different traits in native chicken in S-3 generation

Traits	Sire + Dam	Sire	Dam
ASM (d)	0.392±0.099	0.410±0.169	0.375±0.199
BW 16 wks	0.331±0.096	0.522±0.186	0.141±0.194
BW 40 wks	0.475±0.109	0.217±0.151	0.372±0.220
EW 28 wks	0.388±0.107	0.3600.176	0.416±0.223
EW 40 wks	0.270±0.118	0.220±0.181	0.320±0.263
EP 40 wks	0.124±0.088	0.095±0.124	0.153±0.211

Response to selection

The phenotypic response was positive for body weight and egg weight at 40 weeks of age. Similarly hen housed, hen day and survivors' egg production upto 40 weeks of age was positive for S-3 generation of native chicken (Table 7).

Table 7. Phenotypic response in primary and various correlated traits in S-3 generation of native chicken

Sl. No.	Traits	Response
1	Average age at first egg (d)	-2.57
Body weight (g)		
2	16 wks	-104.00
3	40 wks	71.73
Egg weight (g)		
4	28 wks	-0.34
5	40 wks	0.9
Egg production to 40 wks (Nos.)		
6	Hen Housed	3.24
7	Hen Day	4.43
8	Survivors	5.70

Performance evaluation of three way cross (NDR)

During the current year NDR (IWN X Native (Desi) X RIR) population was evaluated up to 72 weeks of age at farm. Hen housed, hen day and survivors' egg production of NDR cross up to 64 weeks of age at farm was 182.2, 188.8 and 201.3, respectively while hen day egg production up to 72 weeks of age was 217.8 eggs.

B. Improvement of IWN and IWP strains of White Leghorn

The centre has evaluated the IWN and IWP strains for S-30 generation up to 64 weeks of age and S-31 generation up to 28 weeks of age during the year 2018-2019.

Selection records

The summary of selection records for last five generations is presented in Table 8. The average selection differential in IWN and IWP strains was 8.46 and 11.58, respectively in S-31 generation.

Table 8. Summary of selection records of IWN and IWP strains for last five generations

Strains	Generation	Sires	Dams	Ne (Contributed)	SD in females	SI (σ)
IWN	S-27	50	288	170.4	21.61	0.483
	S-28	50	278	169.5	14.40	0.580
	S-29	50	277	169.4	14.39	0.320
	S-30	50	298	171.3	10.55	0.27
	S-31	**50**	**280**	**169.7**	**8.46**	**0.422**
IWP	S-27	50	294	179.3	20.57	0.505
	S-28	50	275	169.2	17.90	0.490
	S-29	50	263	165.2	16.66	0.330
	S-30	50	297	171.2	10.26	0.29
	S-31	**50**	**282**	**169.9**	**11.58**	**0.580**

Incubation records

Fertility in IWP strain increased in S-31 generation by about 2% compared to its previous generation. However, fertility in IWN strain was more or less equal to previous generation. Hatchability on total and fertile egg set basis in IWN, IWP and control populations were lower as compared to previous generation (Table 9).

Table 9. Incubation records in last four generations

Gen.	Strain	Eggs set	Fertility (%)	Good chicks	Hatchability (%)	
					TES	FES
S-28	IWN	6189	93.97	4561	75.20	80.02
	IWP	5953	91.01	4076	69.86	76.76
	Control	667	85.76	522	79.91	93.18
S-29	IWN	5707	84.72	4244	74.55	87.96
	IWP	5794	83.44	4081	71.76	86.01
	Control	499	80.10	308	64.33	80.25
S-30	IWN	6156	88.55	4865	79.60	89.83
	IWP	7017	83.64	5110	73.34	87.69
	Control	590	84.74	470	90.60	98.75
S-31	**IWN**	**6980**	**88.86**	**4903**	**70.94**	**86.66**
	IWP	**6404**	**85.09**	**4073**	**64.27**	**85.58**
	Control	**595**	**90.42**	**490**	**84.03**	**92.93**

Mortality

The mortality of IWN and IWP birds of S-30 generation slightly exceeded the specified limit during 17-64 weeks of age. The mortality of IWN and IWP birds of S-31 generation was well within the specified limit of 8 and 6% during 0-8 weeks, 9-16 weeks and 17-40 weeks (Table 10).

Table 10. Mortality percentage at different ages (wks) in last five generations

Gen.	Strains	0-8	9-16	17-40	17-64
S-27	IWN	5.27	0.64	3.04	5.32
	IWP	3.93	0.60	4.63	5.83
	Control	22.22	7.14	0	0
S-28	IWN	6.57	7.96	6.26	10.85
	IWP	4.97	0.22	5.00	10.00
	Control	2.87	7.03	5.33	11.33
S-29	IWN	5.3	2.41	2.38	6.34
	IWP	5.8	1.39	3.98	5.18
	Control	5.4	3.82	7.62	12.38
S-30	IWN	4.89	1.45	6.75	**16.08**
	IWP	2.09	2.35	7.70	**17.84**
	Control	1.20	4.40	5.40	**8.84**
S-31	**IWN**	**6.57**	**4.05**	**3.43**	-
	IWP	**6.04**	**3.35**	**5.87**	-
	Control	**2.65**	**0**	**3.75**	-

Production performance

Egg production upto 64 weeks of age during last five generations in IWN, IWP and control populations is presented in Table 11. Least square means for different economic traits up to 64 weeks of age in both selected strains (IWN and IWP) and in control population during the S-30 generation is presented in Table 12. The hen day egg production up to 64 weeks of age in S-30 generation increased by 3.0 eggs in IWN and decreased by 4.9 eggs in IWP strains, respectively. The survivors' egg production up to 64 weeks of age increased by 7.2 in IWN and marginally decreased by 1 egg in IWP strains in S-30 generation when compared to previous generation. Hen housed egg production up to 72 weeks of age was 300.3 and 302.98 eggs in IWN and IWP strains, respectively which again decreased by 0.9 and 1.12 eggs, respectively in IWN and IWP strains over previous generation. Growth and production performance of IWN, IWP and control populations during S-31 generation is presented in Table 13.

Table 11. Egg production to 64 weeks of age (Nos.) over last five generations in different strains

Gen.	IWN			IWP			Control		
	HH64	HD64	Sur64	HH64	HD64	Sur64	HH64	HD64	Sur64
S-26	251.4	259.4	261.2	254.1	261.2	262.9	210.0	212.0	212.1
S-27	264.8	270.8	272.0	255.1	262.2	262.4	218.6	218.6	218.6
S-28	256.7	261.2	263.8	261.3	266.7	268.2	177.6	192.1	194.0
S-29	254.9	260.2	261.6	261.2	267.9	268.8	174.1	184.9	187.9
S-30	**245.7**	**263.2**	**268.8**	**247.8**	**262.9**	**267.8**	**176.8**	**185.4**	**186.0**

Table 12. Growth and production performances of IWN and IWP strains and control layer population (S-30 generation)

Traits	IWN		IWP		Control	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g)						
16 wks	622	1081±2.77	753	1103±2.92	147	1023±7.18
40 wks	580	1497±5.73	695	1500±5.03	139	1511±16.76
64 wks	**516**	**1502**±7.46	**635**	**1544**±7.15	**133**	**1522**±19.51
ASM (d)	619	139.58±0.39	753	135.44±0.46	145	156.23±0.67
Egg weight (g)						
28 wks	595	48.11±0.13	727	48.62±0.11	140	49.05±0.27
40 wks	557	52.03±0.16	681	52.11±0.15	131	53.01±0.29
64 wks	**469**	**52.56±0.17**	**586**	**53.80±0.18**	**94**	**56.28±0.48**
EP to 40 wks (Nos.)						
Hen housed	622	120.23±0.99	753	124.83±0.88	147	86.99±1.79
Survivors'	580	124.47±0.71	699	129.51±0.60	140	89.54±1.46
Hen day: 17-40 wks		122.85		127.83		89.04
Hen day: 21-40 wks		120.76		123.57		89.42
EP to 64 wks (Nos.)						
Hen housed	622	245.65±2.57	753	247.78±2.23	147	176.83±4.20
Survivors'	507	268.84±1.19	635	267.82±1.18	135	186.02±3.33
Hen day		263.19		262.94		185.43
EP to 72 wks (Nos.)						
Hen housed	468	300.3±2.35	350	302.98±3.08		-
Survivors'	405	316.61±1.06	305	321.68±1.01		-
Hen day		309.75		319.21		-

Table 13. Growth and production performances of IWN and IWP strains and control layer population (S-31 generation)

Traits	IWN		IWP		Control	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g)						
16 wks	896	1047.99±3.21	902	1082.17±2.95	160	970.5±7.63
ASM (d)	894	144.37±0.32	889	139.54±0.31	160	147.43±0.86
Egg weight (g)						
28 wks	878	50.29±0.106	889	50.05±0.12	155	46.64±0.28

Table 14. ASM and body weights at 64 weeks of age in last five generations in different strains

Generations	IWN		IWP		Control	
	ASM (d)	BW 64 (g)	ASM (d)	BW64 (g)	ASM (d)	BW64 (d)
S-26	138.8	1643	139.4	1731	170.9	1589
S-27	139.0	1547	139.1	1547	145.3	1440
S-28	144.5	1544	139.6	1585	153.1	1580
S-29	141.4	1498	139.9	1486	154.6	1484
S-30	**139.6**	**1501**	**135.4**	**1543**	**156.2**	**1521**

Frequency distribution

The frequency of egg production up to 64 weeks of age in IWN and IWP strains in S-30 generation was maximum in the class interval of 261-280 while in control population it was maximum in the class interval of 181-200 (Table 15). The trend is similar to that of earlier generation.

Egg weight

The egg weight at 28 weeks of age increased marginally in IWN and IWP strains compared to last generation. However, egg weight at 40 and 64 weeks of age slightly decreased in IWN and IWP lines in the present generation as compared to last generation (Table 16).

Heritability estimates

The heritability estimates of egg production up to 64 weeks of age were moderate in IWN line while they were low in IWP strain during S-30 generation. The heritability estimates of egg weight and body weight were high in magnitude in both strains (Table 17).

Table 15. Frequency distribution of egg production up to 64 weeks of age (S-30 generation)

Class interval	IWN	IWP	Control
<100	0.075	0.063	0.102
101 - 120	0.015	0.013	0.034
121 - 140	0.018	0.012	0.034
141 - 160	0.008	0.012	0.075
161 - 180	0.011	0.019	0.156
181 - 200	0.011	0.027	0.238
201 - 220	0.036	0.029	0.218
221 - 240	0.044	0.064	0.095
241 - 260	0.164	0.129	0.048
261 - 280	0.350	0.330	0.000
281 - 300	0.252	0.276	0.000
>300	0.016	0.025	0.000

Table 16. Mean egg weights at various ages in last five generations in different strains

Strains	Generation	Egg weight (g)		
		28 wks	40 wks	64 wks
IWN	S-26	51.48	53.45	54.09
	S-27	48.98	51.91	55.03
	S-28	48.00±0.10	52.16±0.10	54.16±0.37
	S-29	47.33±0.10	52.15±0.10	53.19±0.11
	S-30	48.11±0.13	52.03±0.16	**52.56±0.17**
IWP	S-26	53.25	55.06	56.63
	S-27	49.74	52.09	56.53
	S-28	48.22±0.09	51.46±0.11	55.3±0.13
	S-29	48.39±0.09	52.13±0.09	53.58±0.11
	S-30	48.62±0.11	52.11±0.15	**53.80±0.18**
Control	S-26	47.26	51.10	53.13
	S-27	46.60	52.61	54.95
	S-28	48.11±0.28	52.21±0.31	51.11±0.47
	S-29	444.40±0.85	51.01±0.47	53.92±0.57
	S-30	49.05±0.27	53.01±0.29	**56.28±0.48**

Table 17. Heritability estimates of different traits in IWN & IWP strains (S-30 generation)

Strains	Traits	Sire + Dam	Sire	Dam
IWN	ASM	0.033±0.092	0.075±0.100	0.591±0.196
	BW 16 wks	0.376±0.093	0.543±0.185	0.209±0.194
	BW 40 wks	0.641±0.104	0.356±0.162	0.926±0.204
	BW 64 wks	0.387±0.118	0.430±0.206	0.343±0.262
	EW 28 wks	0.337±0.095	0.184±0.127	0.489±0.203
	EW 40 wks	0.325±0.100	0.144±0.128	0.507±0.218
	EW 64 wks	**0.383±0.119**	**0.302±0.185**	**0.464±0.264**
	EP 40 wks	**0.189±0.093**	**0..280±0.154**	**0.097±0.219**
	EP 64 wks	**0.164±0.111**	**0.005±0.126**	**0.324±0.269**
IWP	ASM	0.084±0.065	0.168±0.102	0.00±0.00
	BW 16 wks	0.569±0.092	0.391±0.150	0.747±0.179
	BW 40 wks	0.448±0.089	0.379± 0.148	0.517±0.178
	BW 64 wks	0.341±0.091	0.546±0.184	0.137±0.191
	EW 28 wks	0.201±0.075	0.327±0.135	0.076±0.165
	EW 40 wks	0.545±0.093	0.455±0.163	0.634±0.182
	EW 64 wks	**0.624±0.105**	**0.448±0.180**	**0.800±0.210**
	EP 40 wks	**0.062±0.065**	**0.102±0.092**	**0.022±0.164**
	EP 64 wks	**0.035±0.072**	**0.069±0.097**	**0.000±0.000**

Response to selection

The phenotypic response for age at sexual maturity was negative in IWN and IWP strain. Similarly phenotypic response for egg weight at 64 weeks of age was negative in IWN and positive for IWP strains (Table 18). Phenotypic response for hen day egg production up to 64 weeks of age was positive in IWN strain and negative in IWP strain. The phenotypic response realized in S-30 generation for hen-housed, hen-day and survivors egg production up to 64 weeks of age were -9.31, 3.02 and 7.27eggs in IWN strain (Response was negative for hen housed and positive for hen day and survivors egg production). The respective values for IWP strain were -13.47, -4.96 and -0.97eggs.

Genetic Response

The genetic response for hen housed egg production up to 64 weeks and egg weight at 64 weeks of age was negative in both IWN and IWP strain in S-30 generation. However, genetic response for body weight at 64 weeks of age was negative in IWN and positive for IWP strain in this generation (Table 19).

Table 18. Phenotypic response in primary and various correlated traits (S-30 generation)

Sl. No.	Traits	IWN	IWP
1	Average age at first egg (d)	-1.78	-4.45
Body weight (g)			
2	16 wks	30.11	61.00
3	40 wks	50.21	14.18
4	64 wks	3.64	57.56
Egg weight (g)			
5	28 wks	0.78	0.23
6	40 wks	-0.12	-0.02
7	64 wks	-0.63	0.22
EP 40 wks (Nos.)			
8	Hen Housed	-2.51	3.8
9	Hen Day	-0.28	3.71
10	Survivors	1.24	5.18
EP 64 wks (Nos.)			
11	Hen Housed	-9.31	-13.47
12	Hen Day	3.02	-4.96
13	Survivors	7.27	-0.97

Table 19. Genetic gain in primary and various correlated traits (S-30 generation)

Traits	IWN	IWP
ASM (d)	-3.42	-6.09
Body weight (g)		
16 wks	41.81	72.7
40 wks	-86.83	-122.86
64 wks	-34.24	19.68
Egg weight (g)		
28 wks	-3.87	-4.42
40 wks	-2.12	-2.02
64 wks	-2.99	-2.14
EP 40 wks (Nos.)		
HH	-3.51	2.8
HD	-0.17	3.82
S	-0.09	3.85
EP 64 wks (Nos.)		
HH	-12.07	-16.23
HD	2.49	-5.49
S	9.19	0.95

Supply of germplasm

Total germplasm supply from the centre was 1,33,829.

Revenue generation

The centre has generated the revenue of Rs. 35.01 lakhs, which was 131% of the recurring expenditure on feed (Rs. 26.8 lakhs).

Anand Agricultural University, Anand (Gujarat)

Programme activity assigned

- Conservation, characterization and improvement of native chicken germplasm (Ankaleshwar).
- The egg production up to 64 weeks of age will continue to be the selection criterion in IWN and IWP strains. To maintain all the surviving birds of first hatch to record egg production till 72 weeks of age.
- To participate with IWN X IWP cross in RSPP tests being conducted by Govt. of India each year.
- To develop location specific chicken varieties and their dissemination for village poultry.

Action taken

- The S0 generation of IWN and IWP strain was evaluated up to 64 weeks of age. The S7 generation of IWD and IWK strain was maintained and evaluated up to 64 weeks of age.
- Hatching eggs of Ankaleshwar breed were set for incubation to produce 4000 chicks.
- Birds of IWN and IWP strains will be under conservation mode now onwards as decided in last ARM.
- Stock of RIR line was removed and crosses will not be produced now onwards as decided in last ARM.

Achievements

A. Development of location specific rural germplasm (egg type)

Evaluation of native germplasm

During the reporting period, birds of S-0 generation of RIR and S-2 generation native chickens were evaluated up to 40 weeks of age.

Performance of Native and RIR breeds

Production performance of RIR and native birds is presented in Table 20. A total of 483 pullets of RIR and 465 pullets of Native were housed individually at 16 weeks of age and evaluated up to 40 weeks of age. Body weight was higher in RIR as compared to native birds. Egg production was higher in RIR as compared to Native birds. Egg production up to 40 weeks was 93.60 in S-0 generation of RIR, whereas, it was 66.40 in S-2 generation of native chickens. Egg production up to 40 weeks of the age was lower in S-2 generation of native chickens (66.40) as compared to S-1 generation (71.29). Egg weight was higher in RIR as compared to Native chickens. Feed consumption was higher in RIR as compared to Native chickens. Mortality (%) during 17-40 weeks of age was 6.42 and 7.31 in RIR and native chickens, respectively (Table 21).

Production performance of F_1 (IWN X Native) and Terminal cross (F_1 X RIR)

Production performance of F_1 (IWN X Native) and Terminal cross (F_1 X RIR) birds is presented in Table 22. During the reporting period, birds of F_1 (IWN X Native) and Terminal cross (F_1 X RIR) were evaluated up to 64 weeks of age. A total of 170 pullets of F_1 cross (IWN X Native) and 175 pullets of Terminal cross (F_1 X RIR) under farm testing were housed individually at 16 weeks of age and evaluated up to 64 weeks of age. Body weight was higher in terminal cross as compared to F_1 cross. Egg production was higher in F_1 cross as compared to Terminal cross. Egg weight was higher in Terminal cross as compared to F_1 cross. Egg production up to 64 weeks of the age was higher in birds of F_1 (IWN X Native) during 2018-19 (194.4) as compared to 2017-18 (188.4). Egg production up to 64 weeks of the age was higher in birds of Terminal cross (F1 × RIR) during 2017-18 (208.94) as compared to 2018-19 (176.32). Feed consumption was higher in Terminal cross as compared to F_1 cross. Mortality was higher in birds of F_1 as compared to birds of Terminal cross because of incidences of Marek's disease.

Terminal cross (F_1 X RIR) was also evaluated up to 40 weeks of age under field testing and results are presented in Table 23. The mortality observed in F_1 cross and terminal cross is given in Table 24.

B. Improvement of IWN and IWP strains of White Leghorn

During the period under report the S-0 generation of IWN and IWP strain was evaluated up to 64 weeks of age.

Incubation records

The summary of incubation records of IWN and IWP strains during last five generations is presented in Table 25. Fertility and hatchability were excellent in IWN and IWP strains (S0 gen.) as well as in control population as compared to previous generations.

Table 20. Production performance of Native (S-2) and RIR (S-0) birds

Traits	Native			RIR		
	N	S-2	S-1	N	S-0 (New)	S-1
No. of pullets housed	465	465		483		
ASM (days)	459	154.5±0.41	173.6±0.72	482	147.6±0.46	181.5±0.80
Body weight (g)						
16 wks	465	958±5.66	1005±7.6	483	1199±4.74	1218±6.6
40 wks	431	1479±8.63	1493±13.2	452	1742±6.66	1845±9.2
EP 40 wks (Nos.)	431	66.4±0.97	71.3±1.28	452	93.6±1.03	68.5±0.98
Egg weight (g)						
28 wks	317	36.88±0.19	38.37±0.19	473	50.60±0.16	49.33±0.17
40 wks	317	44.17±0.19	43.93±0.29	391	54.94±0.19	54.89±0.22
Feed cons./bird (kg) 17-40 wks		15.67	15.2	-	17.96	18.79
Mortality (%) 17-40 wks		7.31	28.67	-	6.42	23.58

Table 21. Mortality (%) in RIR (S-0) and Native (S-2)

Generation	0-8 wks	9-16 wks	17-40 wks
Native (S-2)	6.54	0.91	7.31
RIR (S-0)	2.42	0.56	6.42

Table 22. Performance of F_1 and Terminal cross under farm conditions (2018-19)

Traits	F_1 (IWN x Native)		Terminal Cross (F_1 x RIR)	
	N	Mean	N	Mean
No. of pullets housed	170		175	
ASM (d)	166	145.1±0.77	170	154.4 ± 0.74
Body weight (g)				
16 wks	170	984±10.41	175	1152±6.46(F)
40 wks	142	1440±15.52	170	1844±16.44(F)
64 wks	40	1715±11.57	126	2066±21.89(F)
EP (Nos.)				
40 wks	142	100.0±1.82	170	76.59±1.96
64 wks	40	194.4±5.83	126	176.3±3.81
Egg weight (g)				
28 wks	149	42.17±0.20	145	45.24±0.32
40 wks	113	47.34±0.28	158	52.21±0.25
64 wks	40	49.64±0.55	94	52.39±0.46
Feed cons./bird(kg)				
17-40 wks	-	17.08	-	17.64
17-64 wks	-	35.79	-	36.24
Mortality (%)				
17-64 wks	-	22.94	-	6.86

Table 23. Performance of Terminal Cross (Farm and Field Testing) (2018-19)

Traits	Terminal Cross (F_1 x RIR)	Terminal Cross (F_1 x RIR)
	Farm Testing	Field Testing
No. of pullets housed	175	15
ASM (d)	154.4 ± 0.74	160(First egg)
Body weight (g)		
16 wks 40 wks	1152±6.46(F) 1844±16.4(F)	1362(M+F) 1495(F)
EP 40 wks (Nos.)	76.59±1.96	62.00
Egg weight (g) 40 wks	52.21±0.25	42.00
Feed cons./bird(kg) 17-40 wks	17.64	-

Table 24. Mortality (%) in F_1 and Terminal cross (2018-19)

Generation	0-8 wks	9-16 wks	17-40 wks
F_1 (IWN X Native)	5.31	0.98	7.06
Terminal cross (F1 X RIR)	6.04	0.71	2.29

Table 25. Summary of incubation records in IWN, IWP and Control during last five generations

Gen	Strains	Eggs set (Nos.)	Fertility (%)	Hatchability (%)	
				TES	FES
S-11	IWN	6451	90.11	69.43	77.05
	IWP	6241	89.71	70.74	78.85
	Control	327	78.28	56.26	71.87
S-12	IWN	5543	72.48	51.20	70.63
	IWP	5329	71.63	56.56	78.96
	Control	555	83.60	71.53	85.56
S-13	IWN	3325	90.12	66.34	73.58
	IWP	3192	92.24	76.91	83.38
	Control	720	86.11	56.25	65.32
S-14	IWN	4685	75.55	54.81	59.25
	IWP	4312	77.75	72.62	76.91
	Control	579	87.56	73.22	83.62
S-0 (From Mannuthy)	**IWN**	**2181**	**94.96**	**85.92**	**90.49**
	IWP	**2207**	**92.48**	**85.23**	**92.16**
	Control	**807**	**90.33**	**78.31**	**86.69**

Mortality

The summary of mortality records of IWN, IWP and Control population during last three generations is presented in Table 26. Mortality was under permissible limit during all the stages in IWN, IWP and Control population.

Table 26. Mortality (%) during last three generations

Gen	Strains	0-8	9-16	17-40	41-64	17-64
S-13	IWN	4.56	0.83	7.15	2.69	9.65
	IWP	5.04	1.71	8.01	2.36	10.18
	Control	2.96	1.97	8.09	2.52	10.40
S-14	IWN	6.86	1.59	1.44	-	-
	IWP	6.00	1.72	6.00	-	-
	Control	3.13	1.84	-	-	-
S-0 (From Mannuthy)	**IWN**	**4.23**	**2.38**	**3.41**	**0.84**	**4.23**
	IWP	**3.02**	**1.13**	**2.10**	**0.66**	**2.74**
	Control	**4.00**	**0.69**	**1.60**	**2.70**	**4.26**

Growth performance

The growth and egg production performance of IWN, IWP strains and control population (S-0) up to 64 weeks of age in S-0 generation is presented in Table 27. Body weight recorded at 16 weeks of age was higher in IWN and IWP strains as compared to control population. Body weight at 40 weeks of age was lower in IWN as compared to IWP strain .Egg production up to 64 weeks of age was higher in IWN than IWP strain (Table 27). Feed consumption from 17-64 weeks of age in IWN and IWP strains in S0 generation was almost similar, whereas, it was lower in control population (Table 27). Egg production up to 64 weeks of age was higher in both strains as compared to previous generations (Table 28).

Age at sexual maturity and egg weight

Summary of age at sexual maturity and egg weight in IWN, IWP and control population during last five generations are presented in Table 29. Age at sexual maturity was lesser in IWP strain as compared to IWN strain and control population in S-0 generation. Egg weight at 40 weeks of age was higher in IWP strain as compared to IWN strain and control population in S-0 generation. Egg weight at 64 weeks of age was higher in control population as compared to IWN strain and IWP strain in S-0 generation.

Performance of IWD and IWK strains

The S-7 generation of IWD and IWK strain was evaluated up to 64 weeks of age (Table 30). Age at sexual maturity was almost similar in IWD and IWK strains. Body weight at 64 weeks of age was almost similar in IWD and IWK strains. Egg production up to 64 weeks of age was higher in IWD as compared to IWK strain. Egg weight at 40 and 64 weeks of age was higher in IWK as compared to IWD strain. Feed consumption was almost similar in both the strains during 17-40 and 17-64 weeks of age. Mortality was within permissible limit in both the strains during 17-40 and 17-64 weeks of age.

Germplasm supply

The centre supplied a total of 46983 number of germplasm during the year 2018-19. Farmers benefited (covered) are total 1006, among them, 96 farmers were directly benefited and 910 farmers were benefited through IPDP centres, KVK and NGO.

Revenue generation

The centre has generated Rs. 26.16 lakhs which was 86% of the expenditure incurred on the feed (Rs. 30.29 lakhs).

Table 27. Performance of IWN and IWP strains and Control population in S-0 generation

Traits	IWN		IWP		Control	
	N	Mean	N	Mean	N	Mean
No. of pullets housed	615		620		188	
ASM (d)	610	143.66 ± 0.37	613	140.55 ±0.33	186	148.85 ± 0.79
Body weight (g) at						
16 wks	615	1095±3.88	620	1098 ±4.12	188	1056± 5.69
40 wks	593	1468±4.85	604	1555±6.07	183	1460±10.29
64 wks	529	1745±5.49	543	1747±7.14	180	1677±14.88
EP 40 wks (Nos.)						
Survivors'	593	122.7±0.67	603	121.1±0.83	183	101.6±1.35
HH	615	120.4±0.86	620	119.3±0.97	188	100.3±1.47
HD	-	121.9	-	120.4	-	101.4

Traits	IWN		IWP		Control	
	N	Mean	N	Mean	N	Mean
EP 64 wks (Nos.)						
Survivors'	529	280.4±0.78	543	266.9±1.42	180	218.8±2.99
HH	615	263.6±2.16	620	250.5±2.42	188	213.9±3.43
HD	-	274.6	-	257.8	-	218.4
Egg weight (g) at						
28 wks	602	50.76±0.10	587	50.97±0.11	181	49.64±0.20
40 wks	589	52.33±0.13	587	53.31±0.13	175	51.62±0.24
64 wks	504	55.30±0.11	498	54.17±0.12	158	55.95±0.25
Feed consumption / bird (kg)						
17-40 wks	-	16.37	-	16.16	-	17.69
17-64 wks	-	37.59		37.22	-	36.81
Mortality (%)						
17-40 wks	-	3.41	-	2.10	-	1.60
17-64 wks	-	4.23	-	2.74	-	4.26

Table 28. Egg production (Nos.) in IWN, IWP and Control population over last five generations

Traits	Gen.	IWN	IWP	Control
EP 40 wks	S-11	119.3	116.6	103.4
	S-12	127.4	121.2	104.0
	S-13	98.25	93.24	76.95
	S-14	120.7	110.4	-
	S-0	**122.7**	**121.1**	**-**
EP 64 wks	S-11	259.6	254.6	218.6
	S-12	253.1	243.6	206.1
	S-13	211.0	197.9	169.4
	S-0	**280.4**	**266.9**	**-**
EP 72 wks	S-11	301.8	300.3	-
	S-12	294.2	275.0	-
	S-13	280.0	268.6	-

Note: S14 generation of IWN and IWP strains were terminated at 40 weeks of age

Table 29. Age at sexual maturity and egg weight in IWN, IWP and control population in last five generations

Traits	Gen.	IWN	IWP	Control
ASM (d)	S-11	145.3	144.9	151.1
	S-12	138.3	141.9	144.7
	S-13	148.6	150.9	157.2
	S-14	145.43	148.30	148.47
	S-0	**143.66**	**140.55**	**148.85**
EW 40 wks (g)	S-11	52.21	53.10	51.53
	S-12	53.57	54.49	54.79
	S-13	52.10	52.73	51.66
	S-14	52.09	54.06	-
	S-0	**52.33**	**53.31**	**51.62**
EW 64 wks (g)	S-11	54.24	55.61	55.30
	S-12	52.83	52.76	54.58
	S-13	53.37	55.31	55.64
	S-0	**55.30**	**54.17**	**55.95**

Note: S-14 generation of IWN and IWP strains of Anand centre were terminated at 40 weeks of age

Table 30. Performance of IWD and IWK strains (S-7 gen.)

Traits		IWD (S-7)		IWK (S-7)	
		N	Mean	N	Mean
No. of pullets housed		215		215	
ASM (d)		212	145.49 ± 0.60	214	144.81 ± 0.56
Body weight (g) at					
	16 wks	215	1122±6.05	215	1087 ± 6.43
	40 wks	205	1505±10.04	209	1454±8.09
	64 wks	205	1674±12.22	204	1669±14.97
EP 40 wks (Nos.)	Survivors'	205	111.2±1.44	208	107.0±1.14
	HH	215	107.8±1.83	215	105.5±1.15
	HD	-	109.8	-	105.8
EP 64 wks (Nos.)	Survivors'	205	236.8±3.17	204	228.7±2.76
	HH	215	228.8±4.15	215	222.4±3.39
	HD	-	234.7	-	227.9
Egg weight (g) at					
	28 wks	203	50.21±0.18	207	49.84±0.17
	40 wks	195	51.70±0.21	203	53.59±0.24
	64 wks	173	55.00±0.26	159	57.14±0.20
Feed consumption / bird (kg)					
	17-40 wks	-	17.91	-	17.91
	17-64 wks	-	37.72	-	37.58
Mortality (%)					
	17-40 wks	-	4.19	-	2.33
	17-64 wks	-	4.65	-	5.12

Karnataka Veterinary, Animal and Fishery Sciences University, Bengaluru

Programme activity assigned

- Evaluation and selection of local native chicken germplasm and crossing of F1 with PB-2 to produce F2 cross.
- To improve PB-1 and PB-2 lines for the development of sire and dam lines for broiler production.
- To evaluate the control population to measure environmental trend.

Action taken during 2018-19

- Centre completed purification evaluation of growth and production performance of native chicken.
- Data on body weights and other economic traits was recorded.
- Hatching of S-3 chicks (native chicken) and produced F2 by crossing F1 X PB-2.
- Production traits of PB-1, PB-2 and Control lines were evaluated for S-10 and S-23 generation, respectively.
- The S-11 and S-24 generations of PB-1 and PB-2 along with Control lines were regenerated and evaluated for juvenile traits.

Achievements

Collection, conservation and evaluation of native germplasm

Purification of native chicken germplasm was completed as per the technical programme for two generations. The solid black coloured and pure white plumage birds were culled and uniform attractive plumage coloured birds were retained.

The egg production and other production traits in native birds (S-2) were evaluated. The average age at sexual maturity was 165.7 days. Egg weight at 28thweek was 37.74 g and at 40thweek was 43.47 g (Table 31). S-3 generation of native chicken was hatched. The average body weight of day old and 8 week of native chicken was 30.37 and 464.9 g, respectively. The feed efficiency at 0-8 week was 3.15. The overall survivability percentage was 97.16 in 0-8 weeks.

Table 31. ASM, egg weight and weight traits in native birds (S-2)

Traits	N	Mean ± SE
Body weight (g)		
8 wks	1092	455.1.8±3.34
12 wks	263	786.7 ± 7.88
20 wks	270	1270 ± 14.06
40 wks	300	1441± 28.39
52 wks	113	1513± 30.36
ASM (d)	289	165.7 ± 0.67
Egg weight (g)		
28 wks	248	37.74
40 wks	300	44.47

F1 X PB-2 birds

In order to develop location specific chicken variety and as per the technical programme, the breeding programme was initiated. PB-1 males were crossed with native variety and F1 chicks were obtained. The F1 was crossed with PB-2. The average eighth week body weight of the F2 males and females were 1255 (146 Nos.) and 1106 (139 Nos.) g, respectively. The overall mean body weight (8 wks) was 1182g (285 Nos.). The FCR (0-8 wks) was 2.72. The survivability (0-8 wks) was 89.06 percent.

Conservation and utilization of elite germplasm

Selection record

The number of sires and dams contributed to next generation were 32 and 254 in PB1, 20 and 158 in PB2, respectively. The effective number of parents was 114 in PB-1 and 71 in PB-2. The rate of inbreeding was 0.0043 and 0.0056 in PB-1 and PB-2 populations, respectively. Summary of selection records for PB-1 and PB-2 are presented in Table 32 and 33, respectively. In PB-1 and PB-2, selection intensity decreased marginally compared to previous generation.

Incubation records

The fertility and hatchability records for the PB-1, PB-2 and control populations are presented in Table 34. During the current year a total of 1851, 500 and 150 good chicks were hatched in PB-1, PB-2 and control populations, respectively. Fertility and hatchability traits remained static as compared to last generation

in PB-1 and PB-2. In Control population fertility and hatchability improved considerably as compared to last generation.

Mortality

The mortality in the present generation during 0 to 5 weeks was 1.5, 5.6 and 2.0% in PB-1, PB-2, and control line, respectively. Mortality during 0-5 weeks of age increased in PB-2 and control compared to previous generation (Table 35).

Table 32. Summary of selection records for PB-1

Parameters	S-10	S-11
Sires	64	32
Dams	512	254
Sires contributed	44	32
Dams contributed	352	254
Effective number	228	114
Rate of Inbreeding	0.0022	0.0043
SD for male (g)	176	193
SD for female (g)	66	74
Average selection differential (g)	121	87
Selection intensity (σ)	1.34	0.55

Table 33. Summary of selection records for PB-2

Parameters	S-23	S-24
Sires	57	20
Dams	451	158
Sires contributed	35	20
Dams contributed	280	158
Effective number	202	71
Rate of Inbreeding	0.0023	0.0056
SD for male (g)	207	152
SD for female (g)	54	61
Average selection differential	131	71
Selection intensity (σ)	1.26	0.47

Table 34. Incubation records for PB-1, PB-2, and control line

Gen.	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-10	2243	89.34	1730	79.80	89.32
S-11	**2391**	**89.21**	**1851**	**79.72**	**89.36**
PB-2					
S-23	1353	88.03	1010	77.16	87.66
S-24	**663**	**88.24**	**500**	**76.92**	**87.18**
Control					
S-23	202	79.20	127	65.35	82.50
S-24	**210**	**83.81**	**150**	**72.85**	**86.93**

Table 35. Mortality for PB-1, PB-2 and control line (%)

Gen.	0-5 wks	6-16 wks	17-40 wks
PB-1			
S-10	1.91	2.47	0.69
S-11	**1.51**	**2.74**	**4.63**
PB-2			
S-23	1.09	1.40	4.21
S-24	**5.60**	**2.33**	**NC**
Control			
S-23	0.00	5.51	2.22
S-24	**2.00**	**2.04**	**NC**

NC –Not completed

Body weight and feed efficiency

The body weight at day old recorded in PB-1, PB-2 and Control lines were 42.82 (1851 Nos), 43.01 (150 Nos.) and 40.00 (150 Nos.) g, respectively. Five week of age increased in PB-2 and control lines but it decreased in PB-1 line as compared to previous generation. In the current year, Feed Conversion Ratio showed marginal improvement in PB-2 and control lines over previous generation whereas decreased trend was observed in PB-1 line as compared to previous year (Table 36).

Table 36. Juvenile traits over last two generations in PB-1, PB-2 and Control line

Gen.	Body weight (g)		Feed efficiency (0-5 wks)
	Day old	5 wks	
	PB-1		
S-10	40.63 (1730)	1260 ± 3.48 (1697)	2.07
S-11	**42.82 (1851)**	**1246 ± 3.68 (1823)**	**2.09**
	PB-2		
S-23	43.52 (1010)	1085±5.14 (999)	2.38
S-24	**43.01 (500)**	**1126 ± 6.99 (472)**	**2.35**
	Control		
S-23	40.15 (127)	562.4±9.74 (127)	3.98
S-24	**40.00 (150)**	**662.7 ± 10.8 (147)**	**3.84**

* Figures in parenthesis indicate number of observations

Production performance

The production performance in PB-1, PB-2 and control lines up to 52 weeks of age over last two generations are presented in Tables 37, 38 and 39. The average body weight at 20 week recorded in PB-1 (S-10) was 2353±13.70 (358) g. Corresponding values in PB-2

(S-23) was 2205±17.59 (168) g, respectively. The body weight at 20 week of age increased marginally in both the lines in the latest generation, more than the target body weight. Proper feed restriction should be followed to maintain the target body weight.

Table 37. Adult body weight at 20 and 40 wks of females in different lines

Gen.	Body weight (g)	
	20 wks	40 wks
PB-1		
S-9	2290±13.09 (831)	3273±23.33 (200)
S-10	2353±13.70 (358)	3160±29.34 (127)
S-11	**2390±22.85 (450)**	**NC**
PB-2		
S-22	2178±15.87 (697)	3181±27.20 (156)
S-23	2205±17.59 (168)	3200±35.10 (110)
S-24	**2550±28.91 (218)**	**NC**
Control		
S-22	1740±26.21 (50)	2850±44.55 (47)
S-23	1880±56.32 (45)	2980±81.43 (27)
S-24	**2120±42.95 (38)**	**NC**

* Figures in parenthesis indicate number of observations

The ASM recorded in S-10 of PB-1 and S-23 of PB-2 and control lines were 187.6±0.65 (256), 179.46±0.65 (160) and 183.86±1.76 (29) days, respectively. Decrease of ASM was observed in all the lines.

Table 38.Age at sexual maturity and egg weight in different lines

Gen.	ASM (days)	Egg wt (g) at 32 wks
PB-1		
S-9	201.48±0.65 (512)	56.73±0.32 (300)
S-10	**187.64 + 0.65 (256)**	**55.53±0.39 (150)**
PB-2		
S-22	191.16±0.46 (456)	57.10±0.33 (310)
S-23	**179.46±0.65 (160)**	**55.20±0.42 (120)**
Control		
S-22	192.06±1.68 (48)	52.40±0.67 (50)
S-23	**183.86±1.76 (29)**	**50.97±1.07 (30)**

* Figures in parenthesis indicate number of observations

The average egg production at 40 weeks of age (survivor basis) in PB-1, PB-2 and control lines were 63.81±0.54 (254), 61.25±0.99 (158) and 63.48±1.39 (29) eggs, respectively. Corresponding values at 52 weeks of age were 114.22±0.75 (245), 103.89±1.52 (148) and 109.48±2.28 (25) eggs, respectively. The egg production up to 40 and 52 weeks of age increased in PB-1 (S-10) and PB-2 (S-23) lines. In Control lines the egg production at 40 and 52 increased in S-23 generation.

Table 39.Production performance of females

Generations	Egg production (Nos.)	
	40 wks	52 wks
PB-1		
S-9	57.01±0.53 (511)	110.11±0.67 (486)
S-10	**63.81±0.54 (254)**	**114.22±0.75 (245)**
PB-2		
S-22	56.93±0.39 (449)	97.72±0.74 (422)
S-23	**61.25±0.99 (158)**	**103.89±1.52 (148)**
Control		
S-22	66.14±1.43 (47)	117.36±1.69 (47)
S-23	**63.48±1.39 (29)**	**109.48±2.28 (25)**

* Figures in parenthesis indicate number of observations

Response

The average phenotypic and genetic response of 5 week body weight over 12 generations in PB-1 was 17.90 and 30.04 g, respectively. Corresponding values for egg production up to 40 weeks of age over 11 generations in PB-1 was -0.166 and -1.593 eggs. The average phenotypic and genetic response of 5 week body weight in PB-2 over 13 generations was 10.40 and 20.44 g, respectively. Corresponding values for egg production in PB-2 up to 40 week over 12 generations was -0.728 and -1.401 eggs. The phenotypic as well as genetic response of egg production decreased in PB-1 and PB-2.

Random Sample Poultry Performance Test

The centre participated in the 49th RSPPT for broilers at Gurgaon, Haryana during 2018-19. However, it was not completed and no data was provided due some problem.

Field Evaluation of PB-1 X PB-2 Cross Breeds

No. of chicks reared : 160

Average 6th week body weight : 1.542 kg

Average 7th week body weight : 1.98 kg

FCR : 2.20

Survivability : 96.83%

Economics of rearing commercial Raja II (PB-1 &PB-2) birds at field level

1. **Expenditure**

Cost of chick 150 X Rs.16 = 2,400

Cost of feed (approx) up to 6 weeks

150 birds X3.40kg feed X Rs.28 = 14,280

Other expenditure 150 birds X Rs.10 = 1,500

Total Expenditure = 18,180

2. **Income**

146 birds X 1.54kg X Rs.100 = Rs.22,484

Profit (approx) 22,484- 18,180 = **Rs 4,300**

Frequency distribution of 5 week body weight

Frequency distribution for body weight at 5 weeks of age in both the selected lines is presented in graphical form below.

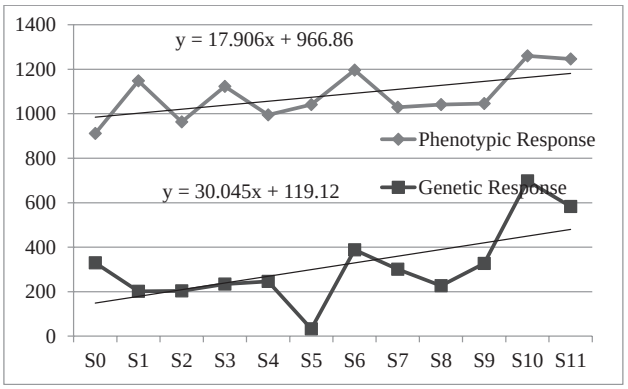


Fig 1. Genetic and phenotypic response to 5 week body weight in PB-1

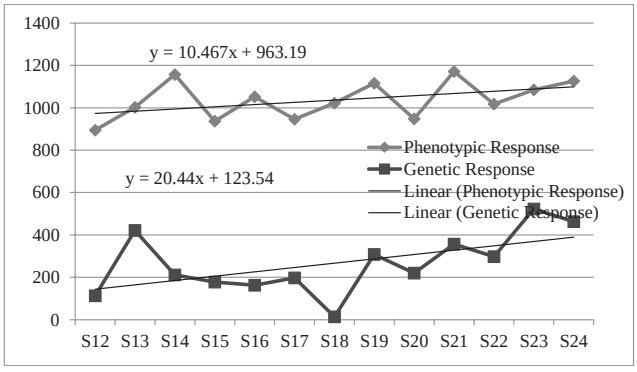


Fig 2. Genetic and phenotypic response to 5 week body weight in PB-2

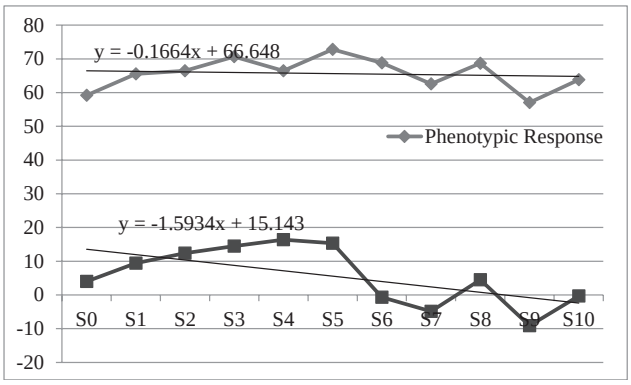


Fig 3. Genetic and phenotypic response of egg production up to 40 wks in PB-1

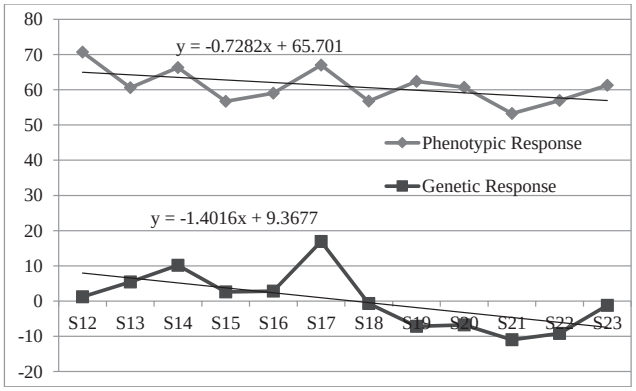


Fig 4. Genetic and phenotypic response of egg production up to 40 wks in PB-2

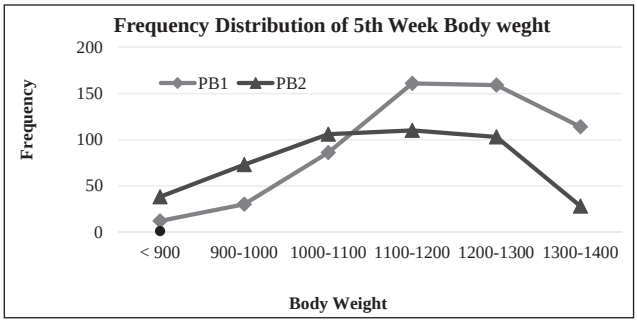


Fig 5. Frequency distribution of 5th week body weight in PB-1 and PB-2 lines

Germplasm

A total of 1,95,817 germplasm (1,94,814 day old chicks and 1,003 hatching eggs) were supplied to farmers and other stakeholders (365 farmers) during the current year.

Receipts

During the year 2018-19, the centre generated revenue of Rs. 52.32 lakhs which was 169% of expenditure on feed cost (Rs. 30.94 lakhs).

Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (Punjab)

Programme activity assigned

- Evaluation of native chicken germplasm collected from farmers.
- Evaluation of PB-2 X Desi dual cross.
- To evaluate and improve the PB-2 and PB-1 populations as a broiler dam and sire lines.
- To evaluate a control population for evaluating the environmental fluctuations.

Action taken during the year 2018-19

- Centre has initiated collection and evaluation of native chicken germplasm (*Punjab Brown*).
- Different parameters viz; fertility percent, hatchability percent, juvenile traits, ASM, egg weights at 28 and 40 weeks, egg production up to 40 and 52 weeks and mortality percent at different time intervals were recorded in native chicken germplasm.
- Farm and field evaluation of PB-2 X Local native chicken cross were initiated.
- The centre regenerated S-11 generation of PB-1 and S-43 generation of PB-2 population.

Achievements

Collection, Conservation and Evaluation of native germplasm

The evaluation of local native chicken germplasm (*Punjab Brown*) was carried out using 50 sires and 250 dams. A total of 1600 fertile eggs were set for hatching. The percent fertility in native local chicken was 94.56%. The hatchability percent on TES and FES were 87.05 and 82.31, respectively. A total of 413 fertile eggs of dual purpose cross were set for hatching. The percent fertility in the cross was 95.88%. The hatchability percent on TES and FES were 84.34 and 80.87, respectively. The body weight of native chicks at day one, 4 and 8 weeks were 37.74 ± 0.07, 370.2±2.72 and 765± 6.45 g, respectably (Table 40). The mortality percent in native chicken in different age groups of 0-8, 9-20, 21-40 were 4.86, 4.11 and 2.83, respectively. ASM of *Punjab Brown* was 175.5 days and egg production up to 40 weeks was 55.73 eggs, which is lower by 3 eggs compared to previous generation.

The performance of PB-2 (M) x desi (F) in farm and field were also recorded. Field evaluation of dual cross variety was carried out in association with KVK, Mohali. The 300 dual purpose chicks were distributed to around 10 backyard farmers identified by the KVK. The body weight of chicks at day one, 4 and 8 week of PB-2 x desi was 38.83±0.11, 377.5±11.89, 844±13.51 g in farm. Body weight at 4 and 8 weeks was 368.2±11.89 and 824±11.30 g, respectively in field conditions. The mortality percent in dual purpose cross in different age groups of 0-8, 9-20, 21-40 were 5.69, 3.81 and 3.53, respectively in farm. ASM and egg production in dual purpose cross was 181.5 days and 58.74 eggs in farm and 191.3 days and 55.62 eggs in field. ASM in both native and cross has increased compared to previous generation. There was a significant reduction (18 eggs) in egg production up to 40 weeks in the cross from last generation.

Table 40. Comparative performance of Native local germplasm and its cross with PB-2

Traits	*Punjab Brown*		PB-2 (M) x desi (F) in Farm		PB-2 (M) x desi (F) in Field under KVK	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g)						
Day Old	1317	37.74±0.07	334	38.83±0.11	-	39.83±0.13
4 wks	1198	370.2±2.72	334	377.5±11.89	-	368.2±11.89
8 wks	1098	765±6.45	299	844±13.51	-	824±11.30
12 wks	1048	1041±7.03	254	1352±18.64	-	1312±17.23
16 wks	771	1461±11.80	238	1778±20.17	-	1765±12.16
20 wks	711	2143±13.09	173	2044±22.90	-	2017±18.30
40 wks	600	2619±18.76	70	2892±34.88	-	2853±35.46
FCR (0-8 wks)		3.3		3.2		3.9
ASM (d)	490	175.5±0.87	101	181.5±1.74	-	191.3±3.36
Egg weight (g)						
28 wks	393	43.19±0.16	67	51.02±0.33		NA
36 wks	389	51.20±0.13	57	53.97±0.31		NA
EP 40 wks (Nos.)	490	55.73±0.91	70	58.74±2.00	-	55.62±3.58

Conservation and utilization of elite germplasm

Selection records

Summary of selection records over the last two generations for PB-1 and PB-2 are presented in Table 41. The PB-1 population was reproduced utilising 70 sires and 400 dams during S-11 generation and S-43 generation of PB-2 population was reproduced utilising 70 sires and 410 dams. The intensity of selection improved in the current generation as compared to previous generation.

Table 41. Summary of selection records in last two generations in PB-2

Parameters	PB-1		PB-2	
	S-10	S-11	S-42	S-43
Sires	62	70	80	70
Dams	372	400	480	410
Sires contributed	62	70	80	70
Dams contributed	372	400	480	410
Effective number	213	238	274	239
Rate of inbreeding	0.002	0.0021	0.002	0.002
Average Expected selection differential	145	128	44	157.5
Selection intensity (σ) M	3.32	3.17	3.09	3.14
F	2.96	2.98	2.76	2.91
Expected response	2.90	23.04	0.88	23.63

Incubation information

During the current generation a total of 2995, 3548 and 275 good chicks were hatched in PB-1, PB-2 and Control populations, respectively (Table 42). The fertility was 89.60, 96.19 and 82.57 % in PB-1, PB-2 and control lines. The hatchability on total eggs set was 84.14, 82.31 and 78.57% in PB-1, PB-2 and control lines, respectively. The fertility and hatchability on TES increased in all the three lines as compared to last generation.

Mortality

During 0-5 week, the mortality reported in PB-1, PB-2 and control lines were 5.77, 4.68 and 5.46%, respectively (Table 43). During grower period mortality of 5.95, 5.85 and 6.38% was recorded in PB-1, PB-2 and control, respectively. Mortality decreased across all age groups in all the lines.

Table 42. Incubation records for PB-1, PB-2 and control line

Gen./ year	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-10	7971	73.93	4398	57.83	78.22
S-11	**3694**	**89.60**	**2995**	**84.14**	**93.90**
PB-2					
S-42	5442	80.06	2656	48.80	61.90
S-43	**4517**	**96.19**	**3548**	**82.31**	**85.57**
Control					
2017-18	630	71.90	407	64.60	89.84
2018-19	**350**	**82.57**	**275**	**78.57**	**95.16**

Table 43. Mortality percentage at different ages in PB-1, PB-2 and control lines

Gen.	Mortality (%)		
	0-5 wks	6-20 wks	21-40 wks
PB-1			
S-10	18.10	16.19	10.9
S-11	**5.77**	**5.95**	**4.84**
PB-2			
S-42	15.80	16.70	5.70
S-43	**4.68**	**5.85**	**5.00**
Control			
2017-18	8.10	14.50	5.60
2018-19	**5.46**	**6.38**	**4.26**

Body weight

During current generation the average body weight at 5 weeks of age was 1166±4.06 (2368), 1071±2.96 (2818) and 826±10.59 (141) g in PB-1, PB-2 and Control lines, respectively (Table 44). The feed efficiency up to 5 weeks of age improved in PB-1 line over last generation. The body weight at 5 weeks of age decreased in PB-1and control lines and increased in PB-2 as compared to previous generation

Production traits

The production traits were recorded up to 52 weeks of age (Table 45, 46 and 47). There was decrease in body weight of PB-1 at 20 weeks of age and reached optimum recommended level for female. Centre implemented the feed restriction program to maintain the required body weight at 20 weeks of age.

The age at sexual maturity decreased in PB-1 and Control lines and increased in PB-2 as compared to previous generation. The egg weight at 36 weeks of age decreased in PB-1 and increased in PB-2 and control lines as compared to previous generation. Egg weight

at 52 weeks decreased in PB-1, PB-2 and control lines. There was appreciable increase in the egg production up to 40 weeks of age in PB-1 and control lines as compared to last generation.

Table 44. Body weight (g) and feed efficiency at 5 weeks during last two generations

Gen./year	BW 5 wks	Feed efficiency (upto 5 wks)
PB-1		
S-10	1200±3.78 (3411)	2.1
S-11	**1166±4.06 (2368)**	**1.91**
PB-2		
S-42	934±7.24 (1265)	1.9
S-43	**1071±2.96 (2818)**	**1.94**
Control		
2017-18	871.4±10.58 (349)	2.2
2018-19	**826.0±10.59 (141)**	**2.02**

Table 45. Adult body weight in PB-2, PB-1 and control lines

Gen./ year	Body weight (g)	
	20 wks	40 wks
PB-1		
S-10	2445±9.59 (1126)	3049±12.01 (893)
S-11	**2205±10.16 (1100)**	**3459±35.19 (400)**
PB-2		
S-42	2319 ±12.1 (706)	2886±11.7 (628)
S-43	**2174±8.58 (651)**	**2988±11.96 (410)**
Control		
2017-18	2417 ±15.45 (178)	3277±22.75 (153)
2018-19	**2042±46.90 (47)**	**2856±57.16 (43)**

Table 46. ASM and egg weights performance at different ages

Gen./ year	ASM (d)	Egg weight (g)	
		36 wks	52 wks
PB-1			
S-10	168.15±0.51(1043)	56.56±0.12 (840)	64.16±0.27 (240)
S-11	**153.46±0.82 (314)**	**54.42±0.12 (420)**	**60.52±0.26 (381)**
PB-2			
S-42	157.26±0.82 (701)	51.31±0.22 (422)	58.73±0.38 (188)
S-43	**171.15±1.29 (586)**	**54.15±0.12 (430)**	**57.46±0.24 (267)**
Control			
2017-18	186.44±1.79 (152)	47.46±0.37 (112)	58.49±0.70 (30)
2018-19	**181.0±5.43 (45)**	**54.43 ±0.70 (30)**	**57.42±0.66 (44)**

Table 47. Egg production performance at 40 and 52 weeks of age

Gen./year	Egg Production (Nos.)	
	40 wks	52 wks
PB-1		
S-10	58.43±0.72 (1043)	111.43±1.48 (350)
S-11	**64.66±0.77 (400)**	**112.38±1.98 (386)**
PB-2		
S-42	68.43±0.87 (350)	103.51 ±0.85 (150)
S-43	**68.61±0.82 (410)**	**112.75±1.29 (237)**
Control		
2017-18	41.50±1.79 (158)	55.11±2.33 (152)
2018-19	**55.36±2.53 (44)**	**89.36±2.55 (44)**

Egg quality traits

The egg quality traits measured at 36 weeks of age in PB-1, PB-2 and control lines were presented in Table 48.

Table 48. Mean and SE for egg quality traits at 36 weeks of age (n=30)

Egg quality traits	Strains		
	PB-1	PB-2	Control
Egg weight (g)	56.48±0.65	55.07±0.62	54.43 ±0.70
Shape Index	75.59±0.66	76.27±0.63	74.89±0.52
Albumen height (mm)	8.05±0.28	7.46±0.29	8.50±0.25
Yolk height (mm)	16.73±0.13	15.98±0.15	17.17±0.27
Yolk diameter (mm)	3.87±0.03	3.79±0.03	3.96±0.03
Yolk index	4.32	4.22	4.34
Haugh unit	90.78	87.90	93.65

Genetic parameters

The heritability estimates for different traits in PB-1 and PB-2 lines are given in Table 49.

Table 49. Heritability estimates for various traits

Traits	PB-1	PB-2
BW 5 wks	0.18±0.11	0.15±0.10
BW 20 wks	0.27±0.14	0.27±0.11
ASM	0.30±0.15	0.28±0.16
EW 36 wks	0.36±0.17	0.39±0.17
EP 40 wks	0.31±0.16	0.21±0.15
EP 52 wks	0.38±0.17	0.31±0.16

Genetic and Phenotypic response

The phenotypic and genetic response over last 12 generations for 5 week body weight was -2.59 and 11.52g in PB-2 population. The phenotypic response of egg production up to 40 weeks of age was -1.20 eggs and genetic response was 1.48 egg over 12 generations in PB-2. Similarly in PB-1 the phenotypic and genetic response for 5 week body weight is presented in Table 48. The phenotypic and genetic response over last 12 generations at 5 week body weight was 8.33 and 20.65 g in PB-1. The phenotypic responses of egg production up to 40 weeks of age was -1.33 egg and genetic response was 1.66 egg over 11 generations (Fig 6, 7, 8 and 9).

Frequency distribution of 5 week body weight

Frequency distribution of 5 week body weight given in Fig 10. In PB-1 the body at 5 weeks ranged from 200 to 1900 g. Similarly in PB-2 range was from 100 to 1700 g.

Evaluation of IBL-80

Average body weight (g) per bird	:	1,530
Total feed consumed per bird (g)	:	3060
Cost of feed @ Rs.25 per Kg	:	76.50
Receipts (sold at Rs.75/kg live wt.	:	114.75
Profit/loss per bird (Rs.)	:	38.25

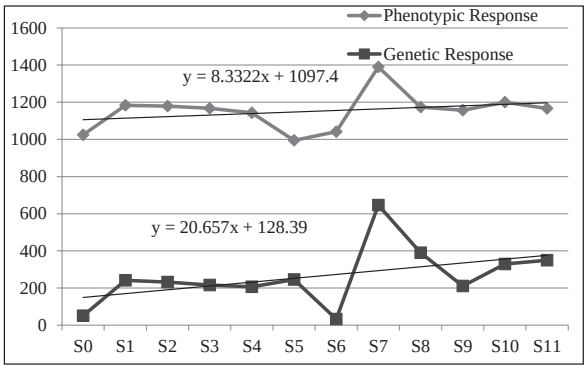


Fig. 6 Genetic and phenotypic response to 5 week body weight in PB-1 at Ludhiana

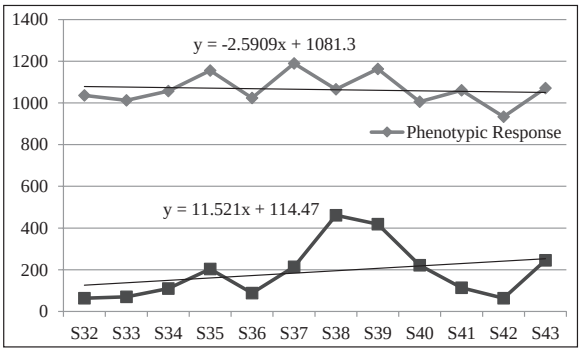


Fig. 7 Genetic and phenotypic response to 5 week body weight in PB-2 at Ludhiana

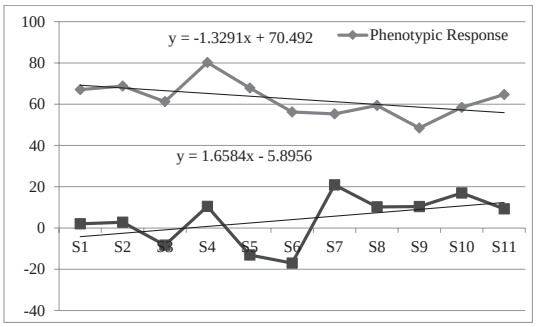


Fig. 8 Genetic and phenotypic response to EP 40 wks in PB-1 at Ludhiana

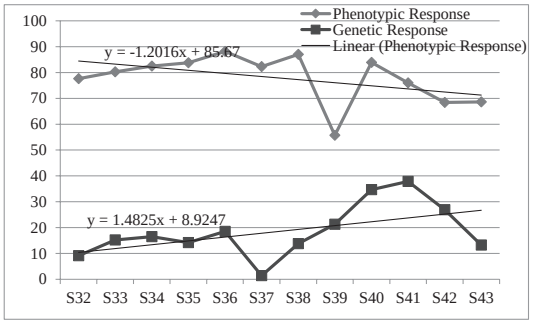


Fig. 9 Genetic and phenotypic response to EP 40 wks in PB-2 at Ludhiana

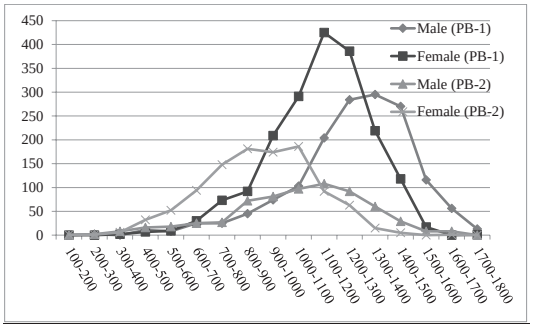


Fig-10 Frequency distribution of BW 5 wks in PB-1 male and female lines and PB-2 male and female lines.

Germplasm

A total of 1,02,049 germplasm (95,641 day old chicks and 6,408 adult birds) were supplied to 300 farmers.

Receipts

Durig the year 2018-19, the centre generated revenue of Rs. 25.51 lakhs which was 90 % of expenditure on feed (Rs. 22.80 lakhs)

Central Avian Research Institute, Izatnagar (Uttar Pradesh)

Programme activity assigned

- Evaluation of local native chicken germplasm and developing crosses.
- To improve and evaluate CSML and CSFL for development of broiler sire and dam lines, respectively.
- To maintain a control population simultaneously to measure the genetic trends.

Action taken during the year 2018-19

- S-3 generation of the native chicks hatched and 929 good chicks were housed.
- The body weights at different age and confirmatory parameters were recorded.
- During the year 2018-19 the centre evaluated CSML and CSFL populations.
- The juvenile traits and production traits up to 52 weeks were recorded.
- A random bred control line was also evaluated to measure environmental fluctuations.

Achievements

Collection, conservation and evaluation of native germplasm

Out of total 1168 eggs set, 912 good chicks were obtained in S-3 generation with fertility, hatchability (TES) and hatchability (FES) of 93.24, 79.54 and 85.31%, respectively. The body weight of local native chicken at 6, 8 and 12 weeks of age were 504.6±10.00 (125), 683.2±14.38 and 1140±22.43 g, respectively. Shank length and breast angle in desi birds at 6 weeks of age were 5.68±0.13 cm and 30.07±0.84 (30)°, respectively. At 40 weeks of age body weight, breast angle, shank length and Keel length, were 2165.6±48.57 g, 51.64±0.42, 7.955±0.07 cm, and 11.188±0.12 cm in desi.

CSML X desi cross

The desi and desi X CSML crosses were obtained and different parameters were recorded. The body weights and conformation traits in desi, CSMLX desi and CSML are presented in Table 50. CMI (foot web index) and humoral immunity (HI titre against NDV) are also given. The immunity traits in desi and its cross were higher compared to CSML purebreds.

Table 50. Body weights and conformation traits at different ages in desi and crosses

Trait	desi	CSML X desi	CSML
Body weight (g)			
6 wks	504.6±10.00 (125)	1065±8.32 (131)	1623±13.84 (130)
8 wks	683.2±14.38	1369±13.37	2299±19.28
12 wks	1140±22.43	1847±22.56	3188±30.42
Shank Length (cm)			
6 wks	5.68±0.13 (30)	6.64±0.08 (30)	6.90±0.09 (28)
8 wks	6.40±0.15	7.33±0.11	7.82±0.08
12 wks	8.58±0.18	9.25±0.13	10.46±0.20
Keel Length (cm)			
6 wks	6.37±0.15 (30)	7.44±0.10 (30)	7.93±0.13 (28)
8 wks	7.08±0.19	8.42±0.13	9.28±0.12
12 wks	9.67±0.17	10.52±0.13	11.89±0.18
Breast Angle (°)			
6 wks	30.07±0.84 (30)	37.30±0.47 (30)	41.79±0.61 (28)
8 wks	34.33±0.82	40.60±0.40	45.67±0.59
12 wks	45.52±0.86	49.46±0.54	57.19±0.73
FCR (0-6 wks)	3.07	2.13	1.61
Cell mediated immunity			
FI (mm)	0.83±0.07(24)	0.80±0.07(24)	0.39±0.30(24)
Humoral immune response			
HI Titre (log_2)	5.05±0.18(20)	3.96±0.20(20)	2.21±0.17(20)

Conservation and utilization of elite germplasm

Selection records

Over last two generations the selection records for CSML and CSFL were summarized in Table 51. The present generation was reproduced utilizing 52 sires and 312 dams in CSML and 52 sires and 312 dams in CSFL. The effective number decreased in both CSML and CSFL. The number of dam used was less as per the technical programme in both the lines.

Incubation information

The incubation records for the CSML, CSFL and the control lines over last three generations were presented in Table 52. The hatchability declined in all the lines.

Mortality

The mortality up to 5 weeks of age increased in the current year as compared to previous year in all the three lines (Table 53). There is a need to control mortality in CSML and CSFL in 6-20 week age group to bring within recommended level.

Table 51. Summary of selection records for two generations in CSML and CSFL

Particulars	CSML		CSFL	
	2017-18 (S-16)	2018-19 (S-17)	2017-18 (S-16)	2018-19 (S-17)
Sires	51	52	51	52
Dams	306	312	306	312
Sires contributed	46	50	46	50
Dams contributed	276	300	276	300
Effective number	157.71	171.43	157.71	171.43
Rate of Inbreeding	0.0032	0.0019	0.0032	0.0019
Average selection differential	-	175	-	155
Average Effective selection differential	-	159.25	-	136.4
Selection intensity (σ)	-	1.70	-	1.281

Table 52. Summary of incubation and hatching results during last three generations

Gen.	Eggs set (Nos.)	Fertility (%)	Good Chicks (Nos.)	Hatchability %	
				TES	FES
CSML					
S-15	5000	85.56	3815	77.26	90.30
S-16	1180	82.72	883	75.68	91.87
S-17	**4163**	**81.89**	**2694**	**66.56**	**81.28**
CSFL					
S-15	5287	88.99	4208	80.99	91.01
S-16	1170	86.58	941	81.88	94.57
S-17	**5058**	**86.65**	**3806**	**77.05**	**88.91**
Control					
S-15	946	84.92	696	74.72	87.26
S-16	520	86.92	404	78.65	90.49
S-17	**1266**	**83.10**	**896**	**71.80**	**86.41**

Table 53. Mortality (%) records for last two generations

Gen.	0-5 wks	6-20 wks
CSML		
S-15	5.70	11.34
S-16	**6.68**	**17.64**
CSFL		
S-15	4.56	9.03
S-16	**5.37**	**14.18**
Control		
S-15	5.69	6.68
S-16	**6.15**	**NR**

Body weights

The body weight at 5 weeks of age and FCR for CSML, CSFL and control lines over last two generations is presented in Table 54. The body weight at 5 weeks of age in CSML, CSFL and control lines recorded in the year 2018-19 (S-16) were 1220±2.78 (2200), 1208.5±2.45 (2100) and 757.4±12.22 (650) g, respectively. The body at 5 week maintained in CSML and CSFL as compared to previous generation. The FCR at 5 week of age in CSML and, CSFL was 1.80 and 1.81, respectively. Recording of body weights of S-17 generation is in progress.

Table 54. Body weight and FCR at 5 weeks during the last two generations

Gen.	5 wks	
	Body weight (g)	FCR
CSML		
S-15	1222±4.65 (650)	2.12
S-16	**1220±2.78 (2200)**	**1.80**
S-17	NC	NC
CSFL		
S-15	1209±1.95 (650)	2.02
S-16	**1208±2.45 (2100)**	**1.81**
S-17	NC	NC
Control		
S-15	754.4±10.48 (375)	2.25
S-16	757.4±12.22 (650)	-
S-17	**732.6±3.50 (752)**	**-**

Production traits

The body weight at 20 weeks was optimum indicating the effectiveness of restricted feeding. The average ASM of CSML and CSFL maintained in the current generation as compared to last generation (Table 55). The 40 week egg production increased in CSML and CSFL and decreased in control as compared to previous generation (Table 56).

Egg quality traits

Egg quality traits were measured in CSML and CSFL (Table 57).

Table 55. Adult body weight and ASM of females in last two generations

Gen.	20 wks BW (g)			ASM(d)		
	CSML	CSFL	Control	CSML	CSFL	Control
S-15	2445±14.13	2402±9.28	2295±12.13	176.58	176.98	178.45
S-16	**2505±23.67**	**2488±23.81**	**2312±21.22**	**176.30**	**176.50**	**-**

Table 56. Production performance of females in last two generations

Gen.	40 wks E.wt (g)			40 wks EP (Nos.)			52 wks EP (Nos.)		
	CSML	CSFL	Control	CSML	CSFL	Control	CSML	CSFL	Control
S-14	62.14	67.07	-	66.5	66.68	54.23	105.5	106.8	91.2
S-15	-	-	-	67.8	67.68	55.45	95.0*	93.3*	-
S-16	**63.96**	**63.77**	**-**	**68.0**	**68.20**	**41.32**	**-**	**-**	**-**

*EP 48 wks

Table 57. Egg quality traits of CSML & CSFL during 2018-2019 (S-16)

Traits	CSML (40 wks)	CSFL (48 wks)
Egg weight (g)	63.95±0.77	63.77±0. 61
Egg length (mm)	59.73±0.69	62.13±0.88
Shape index (Egg width/length*100)	74.44±1.12	77.00±2.40
Albumen height (mm)	6.69±0.19	6.93±0.31
Yolk height (mm)	17.73±0.84	17.59±0.26
Yolk index (height/width)	0.43±0.01	0.39±0.01
Egg shell thickness (mm)	0.35±0.01	0.33±0.01
Haugh unit	79.86 ±1.30	81.83 ±1.32

Response

Genetic response over last 11 generations of CSML and CSFL is presented in Figures 11 and 12. The phenotypic response per generation was 14.77 and 14.69 g in CSML and CSFL, respectively. The genetic response was 15.13 and 15.01g, respectively, in CSML and CSFL lines in last 11 generations.

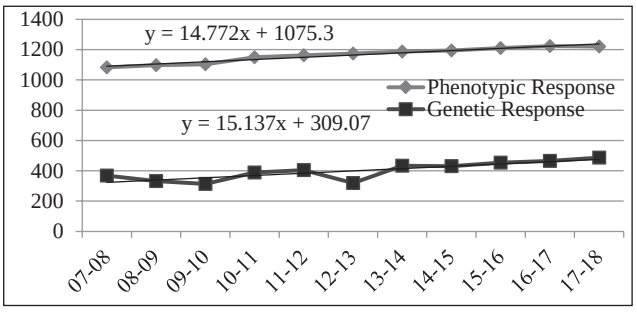


Fig. 11 Genetic and phenotypic response to 5 wks body weight in CSML at Izatnagar

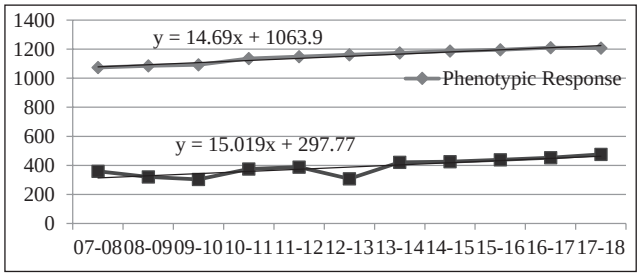


Fig. 12 Genetic and phenotypic response to 5 wks body weight in CSFL at Izatnagar

Random Sample Poultry Performance Test

Centre participated in 50th RSPPT, Gurgaon.

Trademark

Trademark of CARIBRODHANRAJA™ was obtained.

Germplasm supply

A total 51,388 germplasm (23,674 day old chicks and 27,714 fertile eggs) was supplied to the farmers and other stakeholders during the current year.

Odisha University of Agriculture and Technology, Bhubaneswar (Odisha)

Programme activity assigned

- Evaluation of local native chicken (*Hansli*) germplasm.
- To improve and evaluate CSFL and CSML populations for economic traits.
- To evaluate the control population along with CSFL and CSML populations.

Action taken during the year 2018-19

- S-2 generation of *Hansli* chicken was evaluated production and S-3 generation for juvenile traits.
- Evaluated the performance of CSML X *Hansli* and *Hansli*X CSML crosses and triple crosses (CSML X *Hansli* X CSFL and *Hansli* X CSML X CSFL).
- During the period S-7 generation of CSFL and CSML were raised and evaluated for juvenile traits.
- During the current year S-6 generation of CSFL and CSML lines were evaluated for production traits.

Achievements

Collection, Conservation and Evaluation of native germplasm

A total of 870 good chicks of S-3 generation of *Hansli* chicken germplasm was hatched. The fertility was 77.14% which was lower than the previous generation (Table 58). The hatchability on TES and FES basis were 66.97 and 86.83%, respectively, which also decreased as compared to previous generation. The mortality in S-2 generation at 0-8, 9-20 and 21-40 weeks were 4.70, 2.10 and 3.87%, respectively. The mortality percent in 0-8 week age group of S-3 is 4.94% which is well within the prescribed level. The average body weight at day one and 8 week was 32.34±0.04 (870) and 587.0±8.32 (827) g, respectively. The egg production up to 40 week in S-2 generation was 23.14. The egg weight at 40 week was 44.29 g.

Performance of the crosses

The day old body weight of CSML X *Hansli* and *Hansli* X CSML were 34.27 and 40.58 g, respectively, during the year 2018-19. Body weight at 8 weeks of

Table 58. Performance of *Hansli*

Traits	S-2	S-3
Body weight (g)		
Day old	30.29±0.05 (1148)	32.34±0.04 (870)
8 wks	556.6±5.15 (1094)	587.0±8.32 (827)
20 wks	1536±16.23	-
40 wks	3015±48.35	-
FCR (8 wks)	4.09	4.04
Body conformation traits		
Breast Angle (°)	42.63±0.89	43.05±0.99
Shank Length (cm)	7.29±0.06	7.45±0.05
Keel Length (cm)	6.24±0.06	6.78±0.05
Mortality (%)		
0-8 wks	4.70	4.94
9-20 wks	2.10	-
21-40 wks	3.87	-
Fertility (%)	84.05	77.14
Good chicks (Nos.)	1148	870
Hatchability (%) TES	74.17	66.97
FES	88.31	86.83
ASM (d)	173	-
Egg weight (g)		
32 wks	40.39±0.24	-
40 wks	44.29±0.55	-
52 wks	47.09±0.83	
Egg production (Nos.)		
40 wks	23.14	-
52 wks	33.25	-

CSML X *Hansli* and *Hansli* X CSML males were 760.6 and 672.1 g and for females the corresponding values were 667.5 and 552.9 g, respectively. ASM was lower in CSML X *Hansli* (144 days) when compared to and *Hansli* X CSML (170 days) in the present generation (Table 59).

Three-way cross progenies were evaluated for broiler traits (Table 60). The 8th week body weights of CSML X *Hansli* X CSFL and *Hansli* X CSML X CSFL

Table 59. Performance of crosses F1

Traits	CSML X *Hansli*		*Hansli* X CSML	
	G-1	G-2	G-1	G-2
Body weight (g)				
Day Old	30.44 (109)	34.27(238)	40.20 (100)	40.58(218)
5 wks	548.8	521.9	566.3	598.27
8 wks	-	760.6± 1.66 (M) 667.5 ±10.28 (F)		672.0±9.28 (M) 552.9±6.95 (F)
20 wks	2790 (M) 2120 (F)	2299 ±42.50 M) 1758± 53.25(F)	3350 (M) 2480 (F)	2160±13.37 (M) 1663±10.53(F)
40 wks	3760 (M) 3110 (F)	-	3920 (M) 3040 (F)	-
FCR (5 wks)	2.13	2.24	1.97	2.13
ASM (d)	151	144	173	170
Egg weight (g)				
32 wks	44.62±1.03	-	44.91±1.04	-
40 wks	48.13±0.92	-	48.69±0.87	-
52 wks	52.39±1.14	-	52.67±1.15	-
Egg production (Nos.)				
40 wks	50.67	-	48.61	-
52 wks	72.23	-	70.89	-

Table 60. Performance of three-way cross for broiler traits

Traits	(CSML X *Hansli)* X CSFL	*(Hansli* X CSML) X CSFL
Body weight (g)		
Day old	45.54 ± 0.43	43.35 ± 0.36
2 wks	314.2 ± 6.20	350.6 ± 5.32
4 wks	848.2 ± 15.40	930.4 ± 14.09
6 wks	1418 ± 28.22	1651 ± 29.17
7 wks	1581 ± 30.51	1872 ± 33.84
8 wks	1843 ± 29.67	2176 ± 39.94
FCR (8 wks)	2.78	2.39
Morality (%): 0-8 wks	3.3	1.96
Carcass characters (%)		
Dressing	75.69 ± 1.09	77.24 ± 0.57
Breast	22.79 ±10.60	25.32 ± 0.59
Back	18.08 ± 5.54	18.13 ± 0.37
Thigh	16.09 ± 4.38	17.14 ± 0.66
Drumstick	12.98 ± 1.79	14.36 ± 0.53
Wings	10.95 ± 5.83	12.25 ± 0.44
Neck	9.42 ± 2.93	10.06 ± 0.36
Giblet	5.66 ± 0.04	4.23 ± 0.26
Proximate composition of meat		
Breast muscle (%) on DM basis		
Moisture	73.69 ± 0.92	74.42 ± 0.36
Crude Protein	83.32 ± 0.22	84.72 ± 0.14
Ether Extract	2.87 ± 0.05	3.17 ± 0.02
Thigh muscle (%) on DM basis		
Moisture	71.46 ± 0.23	72.40 ± 0.19
Crude Protein	80.74 ± 0.19	81.17 ± 0.08
Ether Extract	5.64 ± 0.12	6.21 ± 0.05

were 1843 and 2177 g, with FCR of 2.78 and 2.39, respectively and differed significantly. The carcass traits and meat compositions of the triple crosses did not differ significantly.

Conservation and utilization of elite germplasm

A total of 32 sires and 256 dams in CSFL and 30 sires and 240 dams were used in CSML to reproduce the S7 generation. The average selection differential increased as compared to previous generation. Selection intensity decreased in CSML but increased in CSFL in the current generation as compared to previous generation. A detail of the summary of the selection records is presented in Table 61.

Incubation records

The overall fertility in CSFL and CSML was 87.55 and 88.12%, decreased compared to previous generation. The hatchability on total and fertile egg set basis in the current generation was similar to the previous generation in CSFL and increased in CSML. The summary of incubation records is presented in Table 62.

Mortality

The mortality during 0-5 weeks in CSFL and CSML line was 4.82 and 4.53 %, respectively. The mortality was well within recommended level in the current generation. Mortality records are presented in Table 63.

Table 61. Summary of selection records of CSFL and CSML (S-7 generation)

Particulars	CSFL		CSML	
Generation	**S-6**	**S-7**	**S-6**	**S-7**
Sires	36	32	36	30
Dams	288	256	288	240
Sires contributed	34	32	34	30
Dams contributed	280	251	278	238
Effective number	121.27	113.53	121.18	106.57
Rate of inbreeding	0.004	0.004	0.004	0.005
Expected selection differential for males (BW 5 wks), g	129.88	237.65	120.34	120.34
Expected selection differential for females (BW 5 wks)	104.33	192.60	135.33	135.33
Average expected selection differential (g)	116.96	215.13	127.84	127.84
Effective selection differential for males (g)	155.18	144.29	143.18	122.51
Effective selection differential for females (g)	124.31	124.92	117.08	148.92
Average effective selection differential (g)	139.75	134.61	130.13	135.72
Selection intensity	0.85M 0.77 F	0.92M 0.82 F	0.83 M 0.87F	0.49 M 0.58 F

Table 62. Incubation records for CSFL, CSML and control line

Gen.	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
CSFL					
S-6	2772	93.76	2280	82.87	88.38
S-7	**2080**	**87.55**	**1635**	**78.61**	**89.79**
CSML					
S-6	3142	89.51	2303	73.17	81.69
S-7	**2146**	**88.12**	**1657**	**77.21**	**87.63**
Control					
S-6	210	89.52	162	79.04	88.29
S-7	-	-	-	-	-

Table 63. Mortality (%) at different ages

Gen.	Age in wks		
	0-5	6-20	21-40
CSFL			
S-6	4.52	**6.48**	**3.49**
S-7	**4.82**	NC	NC
CSML			
S-6	4.84	**5.49**	**4.91**
S-7	**4.53**	NC	NC
Control			
S-6	4.22	2.13	3.37
S-7	NC	NC	NC

NC is not completed, NR is not reported

Body weight

The body weight at 5 weeks of age in CSFL and CSML lines was 1025±6.28(1556) and 1129±6.26 (1582)g, respectively during current generation and slightly improved. FCR up to 5 weeks of age decreased in CSFL and increased in CSML in the current generation. The juvenile traits during current and previous generations are presented in Table 64.

Table 64. Body weight, FCR and conformation traits in CSFL, CSML and control

Gen.	BW 5 wks (g)	FCR	BA (degree)	SL (mm)	KL (mm)
CSFL					
S-6	1006±4.21 (2177)	1.89	51.88±0.08 (2177)	80.1±0.2 (2177)	89.4±0.2 (2177)
S-7	**1025±6.28 (1556)**	**1.94**	**52.06±0.20 (1556)**	**80.55±0.32 (1556)**	**85.76±0.24 (1556)**
CSML					
S-6	1105±4.29 (2162)	1.93	51.35±0.09 (2162)	81.9±0.2 (2162)	92.1±0.2 (2162)
S-7	**1129±6.26 (1582)**	**1.91**	**52.15±0.20 (1582)**	**80.70±0.30 (1582)**	**86.31±0.26 (1582)**
Control					
S-6	761.3±11.07 (159)	1.92	46.87±0.77 (159)	74.8±0.5 (159)	85.3±0.9 (159)

Production traits

The body weight at 20 week of age in CSFL and CSML are well within recommended limit. Restricted feeding regime was effective in controlling the adult body weights. ASM of current generation (S-6) in CSFL (181 d) and CSML (180 d) maintained as compared to previous generation (S-4). Twenty week and 40 week body weights in CSFL and CSML are presented in Table 65.

Table 65. Body weight (g) at 20 and 40 week in CSFL, CSML and Control

Gen.	ASM (d)	BW 20 wks (g)	BW 40 wks (g)
CSFL			
S-5	183	2370±15.34 (300)	3025± 42.09 (300)
S-6	**181**	**2352±16.28 (300)**	**2978±51.76 (300)**
CSML			
S-5	182	2460±26.29 (300)	3234±33.45 (300)
S-6	**180**	**2497±27.18 (300)**	**3279±27.28 (300)**
Control			
S-5	176	2208±17.38 (200)	3153±24.77 (200)

Egg production and egg weight

Egg production up to 40 weeks of age in CSFL and CSML were 52.39 and 58.79. EP40 has decreased in both the lines. Egg production up to 52 week increased in CSFL as well as CSML. Egg weights at 32 week and 40 week in CSFL and CSML has remained static in the current year as compared to previous year. Egg weight and egg production in CSFL and CSML lines are presented in Table 66.

Table 66. Egg weight and egg production in CSFL and CSML lines

Gen.	EW 32 wks (g)	EW 40 wks (g)	EP 40 wks (Nos.)	EP 52 wks (Nos.)
CSFL				
S-5	52.78±0.29	56.17±0.72	64.78	110.11
S-6	**52.99±0.32**	**56.24±0.81**	**52.39**	**84.18**
CSML				
S-5	53.08±0.33	55.74±0.44	61.55	108.19
S-6	**53.64±0.51**	**55.98±0.51**	**58.79**	**90.22**
Control				
S-5	49.87±0.31	53.17±0.44	66.45	108.53

The egg quality

The egg quality traits of CSFL and CSML are presented in Table 67.

Response to selection

The phenotypic response of CSML and CSFL over six generations were 56.19 and 35.14 g, respectively for 5 week body weight. The genetic response in respective lines over 5 generations were 64.37 and 35.75 g (Fig. 13 and 14).

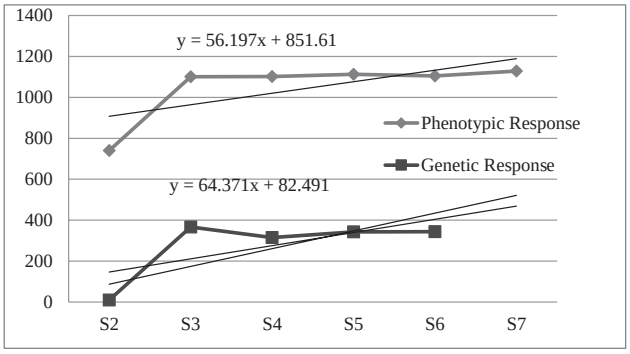


Fig. 13 Genetic and Phenotypic response to BW 5 wks in CSML at Bhubaneswar

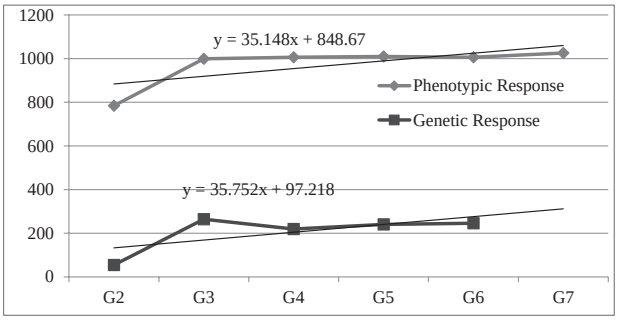


Fig. 14 Genetic and Phenotypic response to BW 5 wks in CSFL at Bhubaneswar

Frequency distribution of 5 week body weight of CSML and CSFL

The body weight of CSFL and CSML at 5th week ranged from 700 to 1500 g. Frequency distribution of 5th week body weight of CSML and CSFL is given in Fig. 15.

Table 67. Egg quality traits at 52 weeks of CSFL and CSML lines

Egg quality traits	CSFL		CSML	
	S-5	S-6	S-5	S-6
Egg weight (g)	58.91±0.81	58.57±0.77	58.43±0.49	58.05±0.46
Shape index (%)	74.09±0.35	75.10±0.37	71.87±0.52	72.06±0.44
Shell Thickness (mm)	0.342±0.04	0.336±0.03	0.417±0.04	0.420±0.04
Albumen Index	0.079±0.005	0.077±0.006	0.079±0.006	0.082±0.005
Yolk Index	0.452±0.004	0.433±0.004	0.481±0.002	0.462±0.002
Haugh Unit	75.88±2.19	74.72±2.25	80.59±1.57	79.68±1.33

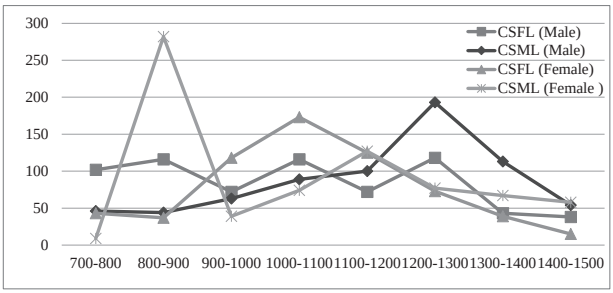


Fig. 15: Frequency distribution of BW 5 wks of CSML and CSFL (Male and Female)

Body weight of cross

Front Line Demonstrations to evaluate the performance of triple cross (*Hansli* X CSML X CSFL) has been conducted. Comparative performance of field and farm are presented in table 68.

Germplasm

This centre supplied a total of 18,810 germplasm to the farmers.

Table 68. Field performance of triple cross (*Hansli* X CSML X CSFL)

Details of the Farmers	No. of Chicks Supplied	Body weight (g)		FCR	
		7 wks	8 wks	7 wks	8 wks
Biswajit Swain AT-Manguliakanta PO-Nuagaon Dist-Jagatsinghpur	200	1904	2192	1.96	2.23
Arun Kumar Sasmal At: Patapur, Kakatpur Dist: Puri	200	1772	2047	2.21	2.41
Farm (AICRP on Poultry)	200	1872	2177	2.17	2.39

Receipts

During the year 2018-19, the centre generated revenue of Rs.4.44 lakhs which is 31% of expenditure on feed (Rs.14.12 lakhs).

ICAR Research Complex for NEH Region, Agartala (Tripura)

Programme activity assigned

- Collection and evaluation of the local native chicken.
- Procurement and evaluation of improved chicken germplasm in the local climatic conditions.
- Production and evaluation of cross of local native birds with improved germplasm
- The centre has to work on development of germplasm for rural poultry for the region utilizing local native population.

Action taken

- During the present year, the centre evaluated Tripura black, *Dahlem Red*, Broiler dam line, BN cross and BND cross.
- Three way cross was evaluated in E-3 generation.
- Performance of dual variety chicken (BND cross) was evaluated at institute farm as well as the farmer's field's conditions

Achievements

During the period under report, the centre hatched 10,954 good chicks of Tripura black and evaluated up to 20 weeks of age. The body weight at 8 weeks was 306.5, 495.0, 1102 and 512.9 g in Tripura Black, *Dahlem Red*, coloured broiler dam line and BN cross, respectively. During E-3 evaluation of BND cross, the 52 week egg production was 94.8 and 82.8 eggs under farm and field conditions, respectively.

Incubation and hatching

A total of 27,044 chicks of different varieties / lines of chicken were produced. The overall average percent fertility was estimated 76.31% in different breeds/ varieties/ lines of chicken. The highest percent fertility was found in Coloured broiler (80.04%) and lowest percent fertility was found in BN cross (67.96%). The highest hatchability on fertile egg set (FES) was found 83.25% in BN cross and the highest hatchability on Total egg set (TES) was found 62.54% in Tripura Black. The lowest hatchability on fertile egg set (FES) and total egg set (TES) was found 63.40% and 46.03% in *Dahlem Red* (Table 69).

Mortality

The mortality during brooding period was lowest in Tripura black (1.23%) and highest in *Dahlem Red* (28.51%). Mortality during growing period ranged from 1.61 – 18.11% and during laying period it ranged from 1.99 -10.71% (Table 70).

Performance of pure lines and crosses

The body weight at 8 weeks was 306.5, 495.0, 1102 and 512.9 g in Tripura Black, *Dahlem Red*, and coloured broiler dam line and BN cross, respectively (Table 71). The 20 week body weight was 1116, 1601, 2789 and 1593 g in Tripura Black, *Dahlem Red*, Coloured broiler dam line and BN cross, respectively.

During E-3 evaluation of BND cross, the 52 week egg production was 94.8 and 82.8 eggs under farm and field conditions, respectively (Table 72).

Table 69. Summary of incubation and hatching of different populations

Strains	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks hatched (Nos.)
				TES	FES	
Tripura Black	2017-18	6915	74.95	79.37	59.49	4114
	2018-19	**17514**	**75.98**	**82.31**	**62.54**	**10954**
CSFL	2017-18	10493	81.42	79.16	64.46	6764
	2018-19	**6704**	**80.04**	**76.79**	**61.47**	**4121**
Dahlem Red	2017-18	3641	80.47	76.89	61.87	2253
	2018-19	**2055**	**72.60**	**63.40**	**46.03**	**946**
BN cross (50%)	2017-18	3300	75.48	81.69	61.66	2035
	2018-19	**3259**	**67.96**	**83.25**	**56.58**	**1844**
BND cross (Dual type)	2017-18	12486	76.31	78.31	59.77	7463
	2018-19	**14870**	**77.37**	**79.77**	**61.72**	**9179**

Table 70. Mortality (%) at different ages

Strain	Year	0-6 wks	7-20 wks	21-40 wks	41-72 wks
Tripura Black	2017-18	4.30	9.32	9.10	9.00
	2018-19	**1.23**	**9.66**	**2.37**	**2.26**
DR	2017-18	4.70	5.10	6.40	6.50
	2018-19	**28.51**	**1.61**	**10.71**	**4.33**
CSFL	**2018-19**	**3.88**	**18.11**	**1.99**	**2.23**
BN cross (50%)	2017-18	5.90	9.55	4.80	5.10
	2018-19	**6.85**	-	-	-
BND cross (Dual type)	2017-18	5.82	3.10	2.80	2.90
	2018-19	**2.69**	**26.24**	**2.30**	**2.57**

Table 71. Performance of different pure lines and BN cross

Traits	Tripura Black	*Dahlem Red*	Coloured Broiler Dam line	BN cross (50%)
Body weight (g)				
Day old	31.40±0.66	34.64±0.47	44.98±0.38	35.04±0.43
4 wks	149.9±3.63	210.4±6.85	417.7±10.19	211.4±7.83
8 wks	306.5±7.87	495.0±17.39	1102.0±36.39	512.9±19.29
12 wks	532.6± 14.24	952.8±29.19	1721±38.47	959.3±31.12
20 wks	1116±29.19	1601±51.39	2789±74.39	1593 ±45.26

Table 72. Performances of BND cross

Traits	BND cross (E-2)		BND cross (E-3)	
	Farm	Field	Farm	Field
Body weight (g)				
Day old	39.40±0.50	-	37.57±0.29	-
4 wks	236.6±8.45	-	234.49±3.26	242.48± 4.84
8 wks	565.0±15.04	503.0± 21.75	499.18±9.44	403.02± 14.21
20 wks	1756±55.36	1595 ± 87.06	1654.21±24.85	1546.15±24.06
40 wks	2220±49.46	1857±27.51	2055.61±45.81	1785.21±56.17
ASM (d)	160±1.22	172.±0.59	156	168
Egg Weight 40 wks (g)	53.20±0.87	48.11±0.27	52.50	47.30
Egg production (Nos.)				
40 wks	50.24±1.10	40.84±0.53	52.50	43.90
52 wks	89.90± 1.15	74.05±0.54	94.80	82.75
72 wks	141.03±1.73	119.01 ±0.71	-	-

Training programme

A total of four training programmes on backyard poultry farming for tribal farmers were organized at different places of Tripura to improve the skills for augmenting poultry production. A total of 204 tribal farmers were trained on all aspects of poultry farming like general care and management, formulation of balance ration using locally available cheap feed ingredients, disease and health management were covered.

Germplasm

A total of 25,275 germplasm was supplied to 300 beneficiaries. The centre need to improve the germplasm supply.

Receipt realized

The centre realized overall receipt of Rs. 10.26 lakhs which was 59% of the expenditure on feed cost (Rs. 17.40 lakhs).

Nanaji Deshmukh Veterinary Science University, Jabalpur (Madhya Pradesh)

Programme activity assigned

- Evaluation and improvement of the local native chicken germplasm and to be maintained as pure line.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition for development of cross.
- Evaluation of *Narmadanidhi* in different agro climatic conditions.

Action taken

- The centre maintained *Kadaknath*, Jabalpur colour, CSML, M-1 and M-2 populations.
- During the current year, the centre evaluated G-9 generation of *Kadaknath* (Kd) and Jabalpur colour populations up to 52 weeks of age.
- Performance of CSML was evaluated.
- The *Narmadanidhi* was evaluated in the field up to 72 weeks of age.
- M1 and M2 were conserved and evaluated.

Achievement

Selection records

The Jabalpur colour population (G-9) was reproduced utilizing 60 sires and 360 dams and *Kadaknath* population (G-9) was reproduced utilizing 36 sires and 216 dams (Table 73). The average effective selection differential was 9.61 and 11.43 in JBC and *Kadaknath* populations and corresponding selection intensity was 0.26 and 0.37 respectively for body weight at 6 weeks of age.

Incubation records

The fertility remained above 80% in all the populations. The fertility improved marginally in all populations. The hatchability on total eggs set improved in Jabalpur colour and *Kadaknath*, whereas, it decreased in CSFL (Table 74).

Mortality

In G-9 generation, during brooding period (0-8 wks) the mortality ranged between 4.41 and 9.09% in all the populations (Table 75). The mortality ranged between 4.12 and 6.06% during the growing period. The centre should take all precautions to reduce the mortality during brooding and growing periods.

Performance of pure lines and different crosses under different management systems

During G-9 generation, the 6 week body weight was 342.3 and 803.7 g in *Kadaknath* and Jabalpur colour population, respectively and comparatively lower than previous generation (397.2 and 827.3 g). The egg weight at 40 weeks of age was 58.3 g in Jabalpur colour and 47.3 g in *Kadaknath*, respectively. The hen housed egg production up to 40 weeks of age was 91.9 eggs in JBL population and 57.3 eggs in *Kadaknath* population and performance improved compared to previous generation. In CSFL 40 week egg weight and production were 60.80 g and 59.0 eggs, respectively (Table 76).

Narmadanidhi, dual type chicken having 25% Kd: 75% JBP colour inheritance was evaluated under farm and field conditions. This variety produced 68 eggs up to 40 weeks of age in farm conditions. *Narmadanidhi* produced 49, 88.1 and 176 eggs up to 40, 52 and 72 weeks, respectively in field conditions (Table 77). The egg production increased in both under farm and field conditions as compared to previous generation. This variety became more popular among the rural farmers and large number of chicks were supplied to the farmers.

Table 73. Summary of selection record of Jabalpur colour and *Kadaknath* (G-9)

Particulars	Jabalpur colour	*Kadaknath*
Sires	60	36
Dams	360	216
Sires contributed	60	36
Dams contributed	360	216
Effective number	206	123
Rate of inbreeding	0.002	0.004
Expected sel. Differential for male (g)	11.56	14.46
Expected sel. differential for female (g)	10.24	13.06
Average sel. differential expected (g)	10.91	13.76
Effective sel. differential for male (g)	10.22	13.20
Effective sel. differential for female (g)	8.98	9.66
Average sel. differential Effective (g)	9.61	11.43
Selection intensity	0.26	0.37

Table 74. Incubation information of different populations

Strain	Generation	Fertility (%)	Chicks hatched (No.)	Hatchability (%)	
				TES	FES
Jabalpur colour line	G-8	82.98	3453	63.32	76.31
	G-9	89.54	3742	66.90	74.87
Kadaknath	G-8	87.12	2144	63.17	72.51
	G-9	88.21	2429	64.20	72.53
CSFL	2017-18	80.32	169	54.52	67.87
	2018-19	80.45	157	51.14	63.56

Table 75. Mortality (%) at different ages

Strain	Generation	0-8wks	9-20 wks	21-40 wks
Jabalpur colour line	G-9	6.30	4.54	2.50
Kadaknath	G-9	5.11	4.12	3.43
Kadaknath Cross	2018-19	4.41	3.81	3.88
M-1	2018-19	9.09	4.90	8.69
M-2	2018-19	8.33	6.06	5.56
CSFL	2018-19	6.20	5.71	4.35

Table 76. Performance of growth and production traits in pure lines

Traits	Jabalpur Colour (G-9)		*Kadaknath* (G-9)		CSML
	N	Farm	N	Farm	Farm
Body weight (g)					
6 wks	2805	803.7±5.8	1751	342.3±6.9	1082±5.4
20 wks	918	1742±18.1	612	1090±19.3	2214±18.9
40 wks	886	2016±22.3	591	1506.7±16.8	2461±22.5
ASM (d)		153		164	181
Egg weight (g)					
28 wks		49.5±0.16		40.4±0.03	-
40 wks		58.3±0.12		47.3±0.01	60.8 ±0.82
EP 40 wks (Nos.)					
HH		91.9		57.3	59.0±1.7
HD		95.7		60.5	
Survivors'		93.1		58.8	
EP 52 wks (Nos.)	532		324		
HH		81.5		152.3	
HD		85.1		156.5	
Survivors'		83.3		153.7	

Table 77. Growth and production traits in *Narmadanidhi*

Particular	Farm	Field
Body weight 8 wks (g)		
(M)	107±14.3	752.4±16.7
(F)	789.2±12.7	648.2±21.4
Body weight 20 wks (g)		
(M)	1840±23.5	1635±12.9
(F)	1611±17.6	1385±17.8
Body weight 40 wks (g)		
(M)	2630±16.8	2560±17.1
(F)	1840±22.7	1680±21.7
ASM (d)	167	-
Egg weight (g) 40 wks	49.1	47-48
Egg Production (Nos.)		
40 wks	68±2.1	49±2.7
52 wks	-	88.1±5.3
72 wks	-	176±4.9

Germplasm

A total of 56,432 germplasm was supplied to 184 beneficiaries during the period 2018-19.

Receipt realized

The centre realized overall receipt of Rs. 20.67 lakhs which was 115.5% of the expenditure on feed (Rs. 17.90 lakhs).

Assam Agricultural University, Guwahati (Assam)

Programme activity assigned

- Evaluation and improvement of the local native chicken germplasm and its maintenance as pure form.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition
- Evaluation of new variety Kamrupa in different agro climatic conditions.

Action Taken

- A total of 765 numbers of local native adult male and female of 12 months of age are kept in the farm and their performances are under evaluation.
- The performance of a flock of 177 nos. of PB-2 male was evaluated.
- A flock of 490 Nos. of crossbred (PB-2 x local native) has been maintained in the centre and their performance was studied up to 52 weeks.
- The performance of 915 nos. of *Dahlem Red* birds was evaluated.
- A flock of 596 nos. of *Kamrupa* was evaluated in the farm and field conditions up to 52 weeks.

Achievement

Incubation records

The summary of incubation records has been presented in Table 78. The average fertility of all the flocks was found to be 89.43%. The hatchability on total eggs set ranged from 52.78 to 83.31%.

Mortality

The mortality during the current year is presented in Table 79. The mortality during brooding and growing period was below 4.04% in all the lines. The mortality during laying period was below 1.81%.

Table 79. Mortality in different populations at different ages

Strain	Year	Age (wks)			
		0-5	6-20	21-40	41-52
Native	2016-17	2.62	1.69	0.29	0.07
	2017-18	3.47	3.86	1.07	15.29
	2018-19	**2.12**	**2.48**	**1.27**	**0.96**
PB-2	2016-17	2.30	0.78	0.79	0.80
	2017-18	4.61	4.03	1.68	0.00
	2018-19	**2.82**	**2.90**	**1.19**	**1.81**
Dahlem Red	2016-17	3.42	2.00	0.55	0.15
	2017-18	3.67	2.42	0.48	3.73
	2018-19	**3.93**	**2.50**	**1.28**	**1.65**
BN cross	2016-17	1.09	0.33	0.11	Nil
	2017-18	2.56	1.18	0.17	6.29
	2018-19	**2.45**	**1.53**	**0.70**	**1.14**
BND cross	2016-17	2.95	1.70	0.54	0.10
	2017-18	6.16	9.96	4.17	14.22
	2018-19	**3.64**	**4.04**	**2.11**	**1.12**

Performance evaluation of germplasm

The results on juvenile and production performance of native, PB-2 and *Dahlem Red* are presented in Table 80. The 5 weeks body weight was 132.5 g in native, 1165 g in PB-2 and 360.2 g in *Dahlem Red*. The ASM was lowest in *Dahlem Red* (161.3 days) and highest in native (175.2 days). Native birds matured early by 1.10

Table 78. Summary of incubation and hatching

Strain	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Local native	2016-17	2385	76.98	60.92	79.14	1453
	2017-18	520	77.12	61.73	80.05	321
	2018-19	**637**	**78.33**	**63.58**	**81.16**	**405**
BN cross	2016-17	1895	63.43	48.28	76.12	915
	2017-18	384	63.54	50.26	79.10	193
	2018-19	**468**	**65.17**	**52.78**	**80.98**	**247**
BND cross	2016-17	32895	78.01	70.40	90.24	23,156
	2017-18	34192	88.10	81.56	92.57	27887
	2018-19	**27189**	**90.11**	**83.31**	**92.45**	**22652**

days and *Dahlem Red* pullets by 0.80 days compared to previous generation. In native population, the egg weight and egg production up to 52 weeks was 40.30 g and 67.50 eggs, respectively. In *Dahlem Red* egg production improved by 3.1 eggs.

Performance of crosses

The five week body weight was 275.6 g and FCR was 3.14 in BN cross. The ASM was 167.9 days and remained almost similar as compared to previous generation. The hen housed egg production up to 52 weeks was 72.6 eggs. Almost all the parameters are same as compared to previous generation (Table 81).

The *Kamrupa* variety was evaluated up to 52 weeks in farm and field conditions during the current year. The 5 weeks body weight was 250.5 g and 210.6 g in the farm and field, respectively. The ASM was 150.6 days in the farm and 170.4 days in the field. The egg weight at 40 weeks of age was 56.10 and 41.90 g, respectively in farm and field. The hen housed egg production up to 40 and 52 weeks of age was 49.20 and 90.40 eggs in the farm and corresponding values in the field were 43.60 and 73.70 eggs, respectively. The performance of cross was slightly improved over last two generations (Table 82).

Germplasm supply

The centre supplied 30,720 (9,218 hatching eggs and 21,502 chicks of *Kamrupa*) germplasm to farmers.

Revenue generation

The centre realized revenue of Rs. 6.26 lakhs during the financial year which was 52% of the expenditure on feed cost (Rs.12.09 lakhs).

Table 80. Juvenile and production traits in pure lines

Traits	Native		PB-2		*Dahlem Red*	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body wt (g) at						
Day old	600	33.9 ± 2.70	130	46.1 ±4.30	500	36.9 ± 2.60
5 wks	570	132.5 ± 6.9	120	1165 ± 90.6	480	360.2 ± 65.5
20 wks	540	1131 ± 95.5	95	2431±185.3	450	1210 ± 110.2
40 wks	490	1610 ± 120.5	60	3361±415.6	400	1741 ± 320.6
FCR up to 5 wks	570	3.25	120	2.73	480	2.65
Conformation traits at 5 weeks of age						
Shank length (mm)	570	48.1 ± 3.2	120	76.3 ± 6.2	480	61.2 ± 3.1
Keel length (mm)	570	51.1 ± 3.2	120	87.8 ± 8.6	480	53.7 ± 2.6
Breast Angle (o)	570	57.2 ± 5.2	120	72.3 ± 4.3	480	63.9 ± 2.4
ASM (days)	300	175.2 ± 6.20	-		340	161.3 ± 6.90
Egg weight (g) at	270	36.10 ± 2.60			310	49.30 ± 4.60
32 wks	250	37.20 ± 4.60	-		280	59.20 ± 7.20
40 wks	230	40.30 ± 3.90	-		250	61.10 ± 6.50
52 wks			-			
EP 40 wks (Nos.)						
Hen housed	300	38.60	-		340	63.10
Hen day	-	40.20	-		-	64.80
Survivors'	260	40.90	-		280	65.70
EP 52 wks (Nos.)						
Hen housed	300	67.50	-		340	119.30
Hen day	-	69.20	-		-	120.60
Survivors'	230	72.30	-		230	121.80

Table 81. Juvenile and production performance of two way cross

Traits		BN cross at Farm	
		N	Mean ± SE
Body weight (g) at	Day old	410	35.60 ± 7.10
	5 wks	390	275.6 ± 26.3
	220 wks	360	1731 ± 160.4
	40 wks	340	2571 ± 360.2
FCR up to 5 weeks		390	3.14
Conformation traits at 5 wks			
	Shank length (mm)	390	51.60 ± 3.70
	Keel length (mm)	390	52.70 ± 8.20
	Breast Angle (o)	390	66.90 ± 8.30
ASM (days)		200	167.9 ± 5.90
Egg weight (g) at			
	32 wks	180	46.60 ± 2.70
	40 wks	160	48.90 ± 6.30
	52 wks	140	58.40 ±5.10
EP 40 wks (Nos.)			
	Hen housed	200	39.20
	Hen day	-	40.30
	Survivors'	160	42.60
EP 52 wks (Nos.)			
	Hen housed	200	72.60
	Hen day	-	73.40
	Survivors'	150	75.20

Table 82. Juvenile and production performance of *Kamrupa* (BND cross)

Traits		Field		Farm	
		N	Mean ± SE	N	Mean ± SE
Body weight (g) at day old		370	37.10 ± 2.70	550	37.10 ± 2.70
	5 wks	350	210.6 ± 7.10	520	250.5 ± 45.6
	20 wks	320	980 ± 95.2	500	1210 ± 160.5
	40 wks	280	1621 ±310.6	480	2140 ± 430.6
FCR up to 5 weeks		350	-	520	2.71
Conformation traits at 5 week of age					
Shank length (mm)		350	49.20 ± 3.60	520	48.90 ± 3.20
Keel length (mm)		350	53.60 ± 7.10	520	50.10 ± 7.20
Breast Angle (o)		350	51.60 ±6.30	520	67.20 ± 8.40
ASM (days)		160	170.4 ± 6.20	270	150.6 ± 4.90
Egg weight (g) at					
	32 wks	230	40.60 ± 2.50	270	50.70 ± 4.80
	40 wks	200	41.90 ± 6.20	250	56.10 ± 3.20
	52 wks	180	43.80 ± 7.10	230	58.20 ± 5.40
EP 40 wks (Nos.)					
	Hen housed	160	43.60	270	49.20
	Hen day	-	44.80	-	50.60
	Survivors'	130	46.20	230	52.80
EP 52 wks (Nos.)					
	Hen housed	160	73.70	270	90.40
	Hen day	-	75.20	-	92.60
	Survivors'	120	76.90	210	93.80

Birsa Agricultural University, Ranchi (Jharkhand)

Programme activity assigned

- Genetic improvement of native chicken for body weight as well as egg production.
- Evaluation and improvement of the local native chicken germplasm and to be maintained as pure line.
- Procurement and evaluation of improved chicken germplasm in the local climate condition.
- Development of new varieties suitable for rural poultry in the region utilizing local germplasm.

Action taken

- The centre evaluated G-6 generation of native population up to 72 weeks of age and G-7 up to 40 weeks.
- The *Dahlem Red* (G-6 generation) of was evaluated up to 40 weeks of age and G-7 up to 16 weeks of age.
- Evaluation of *Jharsim* (E-7) up to 20 weeks of age.
- *Jharsim* birds were distributed among the farmers, NGOs/KVKs and other agencies.

Achievements

The G-7 generation was reproduced with 360 chicks, 100 chicks were evaluated up to 40 weeks and 250 chicks were produced and half sib pedigree was recorded up to 20 weeks of age. A total of 13,560 chicks of three way cross, DBN (*Dahlem Red* Male x PB-2 x Native Female) were produced and 200 birds were evaluated for growth performance up to 20 weeks of age at farm (*Jharsim*).

Incubation records

The fertility ranged from 86.46 to 94.22% in native and *Jharsim* respectively (Table 83). The fertility maintained in pure line and crosses and it needs improvement in native chicken. The hatchability and total egg set was lower in native chicken (68.42%). Hatchability on egg set basis was 78.78% and 84.05% in native chicken and cross, respectively.

Mortality

Mortality during brooding period was reduced compared to previous year (Table 84). Mortality during growing stage was ranging from 3.25 to 6.42% in different populations. During laying period mortality ranged from 4.16 to 6.35%.

Table 83. Summary of incubation and hatching performance

Strains	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Native	2017-18	505	86.93	68.11	78.35	344
	2018-19	**380**	**86.42**	**68.42**	**78.78**	**260**
Jharsim (DBN)	2017-18	13380	94.54	78.57	83.08	10514
	2018-19	**17120**	**94.22**	**79.20**	**84.05**	**13560**

Table 84. Mortality (%) in different populations at different ages

Breeds/strains	Year	0-6 wks	7-18 wks	19-40 wks
Native	2017-18	5.22	4.82	4.34
	2018-19	**4.17**	**3.25**	**4.58**
Dahlem Red	2017-18	5.46	4.92	3.89
	2018-19	**5.37**	**5.33**	**4.69**
PB-2	2017-18	-	-	3.52
	2018-19	**4.68**	**5.21**	**6.35**
PB-2 x desi	2017-18	3.24	4.02	2.82
	2018-19	**-**	**-**	**4.16**
Jharsim	2017-18	7.33	4.95	5.21
	2018-19	**6.85**	**6.42**	**4.65**

Performance evaluation of germplasm

In native population, production traits were evaluated upto 72 weeks of age during G-6 generation and up to 40 weeks in G-7 generation (Table 85). The hen housed egg production up to 72 weeks was 73.96 and hen day was 84.11 eggs in native population (G-6). Egg production up to 40 weeks on hen housed and hen day basis was 30.71 and 32.3 eggs respectively during G-7 generation.

In *Dahlem Red*, the hen housed egg production up to 40 weeks was 44.62 and hen day egg production was 45.38 eggs in G-6 generation. ASM was 182 and 155 days in native and *Dahlem Red*, respectively.

The performance of three way crosses (*Jharsim*) was evaluated up to 20 weeks of age (Table 86). The body weight showed improvement in E7 compared to E6 generation.

Germplasm supply

Centre supplied 25,323 Nos. (4,265 hatching eggs and 21,058 chicks) germplasm to the farmers. The centre should improve the germplasm supply.

Revenue generation

The centre realized a Revenue of Rs. 6.70 lakhs during the financial year which was 87.29% of the expenditure on feed cost.

Table 85. Growth and production performance of different breeds/strains

Traits		Native (G-6)	Native (G-7)	*Dahlem Red* (G-6)	*Dahlem Red* (G-7)
Body weight (g)	day old	32.08±0.24	28.14±0.15	34.98±1.52	33.95±0.24
	4 wks	175.8±1.77	162.5±1.55	175.6±1.02	190.9±1.60
	8 wks	490±3.48	360.6±2.11	429.1±2.90	438.1±4.11
	12 wks	753±3.57	760.9±2.60	816.0 ±3.75	837.7±4.63
	16 wks	1138±5.36	989.2±6.28	1218±3.93	1218±6.55
	20 wks M	1553±10.19	1385±9.22	1717± 9.12	
	F	1368±11.73	1169±2.85	1508±3.67	
ASM (d)		178	182	155	
EW 40 wks (g)		-	40.86±0.24	49.96±0.30	-
EP 40 wks (Nos.)	HD	30.83	32.33	45.38	-
	HH	28.17	30.71	44.62	
EP 52 wks (Nos.)	HD	56.81	-	-	-
	HH	52.89			
EP 64 wks (Nos.)	HD	72.65	-	-	-
	HH	65.13			
EP 72 wks (Nos.)	HD	84.11	-	-	-
	HH	73.96			

Table 86. Performance of *Jharsim* in the farm

Traits		E-6	E-7
Body weight (g)	day old	29.70±0.19	-
	4 wks	183.4±1.11	-
	8 wks	535.2±4.488	-
	12 wks	839.2±5.04	896.9±4.22
	16 wks	1149±5.35	1294±5.03
	20 wks M	1477±8.04	1791±15.91
	F	1314±6.32	1554±4.78
ASM (d)		171	-
EP 40 wks (Nos.)	HD	41.17	-
	HH	39.29	
EP 52 wks (Nos.)	HD	96.98	-
	HH	89.52	
EP 64 wks (Nos.)	HD	93.17	-
	HH	87.16	

Maharana Pratap University of Agriculture & Technology, Udaipur (Rajasthan)

Programme activity assigned

- Evaluation and improvement of the local native chicken germplasm.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition
- Evaluation of *Pratapdhan* in different agro climatic conditions.

Action taken

- G8 generation of *Mewari* breed was evaluated up to 52 weeks of age.
- *Pratapdhan* was evaluated for production traits up to 72 weeks of age during E7.
- *Pratapdhan* (E8) was reproduced and evaluated up to 20 weeks of age.
- RIR and CSFL population were regenerated and being maintained at the centre
- Germplasm of *Pratapdhan* dual purpose variety was supplied to the needy farmers.

Achievement

Incubation records

The centre regenerated G-9 generation of *Mewari* chicken population as well as RIR, CSFL BN and BNR populations. The fertility ranged from 78.06 to 87.00% in all the populations (Table 87). The fertility decreased in most of the populations in this year.

Mortality

The Mortality in various populations is presented in Table 88. The mortality was on lower side (3.25 - 6.68%) in all the populations during juvenile period compared to previous year. During growing period as well the mortality was on lower side in all the populations. The mortality in general is on lower side compared to previous year.

Performance evaluation of germplasm

In *Mewari* population the juvenile body weights at 8 weeks increased during G-8 generation as compared to G-7 generation (Table 89). The age at sexual maturity has increased by 4.4 days as compared to previous (G-7) generation. The hen housed and hen day egg production up to 52 weeks of age increased.

Table 87. Summary of incubation and hatching results of different populations

Strain / breed/cross	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks (Nos.)
				TES	FES	
Mewari chicken	2016-17 (G-7)	3,918	75.27	57.08	75.84	2,210
	2017-18 (G-8)	5,123	78.44	67.70	86.37	3,462
	2018-19 (G-9)	**4,537**	**78.06**	**66.21**	**84.79**	**2,992**
RIR	2017-18	4,200	91.52	79.40	86.75	3,335
	2018-19	**6,500**	**84.49**	**73.78**	**87.31**	**4,827**
CSFL	2016-17	420	87.85	72.62	82.66	305
	2017-18	420	92.97	79.76	85.90	335
	2018-19	**400**	**87.00**	**65.50**	**75.29**	**262**
BN cross	2016-17	4,513	72.73	64.20	88.23	2,893
	2017-18	9,203	76.54	67.31	87.88	6,143
	2018-19	**2,098**	**78.57**	**66.56**	**84.74**	**1,391**
Pratapdhan	2016-17	1,10,842	79.21	63.44	77.85	70,318
	2017-18	98,246	84.80	73.04	86.03	72,450
	2018-19	**82,843**	**81.21**	**70.39**	**86.83**	**58,777**

Table 88. Mortality (%) records in different populations at different age

Strain/breed/ cross	Gen./Year	0-5 wks	6-20 wks	21-40 wks	41- 52 wks
Mewari	G-6	10.26	13.86	8.44	10.61
	G-7	11.76	13.24	9.32	2.50
	G-8	**5.42**	**6.90**	**7.33**	**4.17**
RIR	G-7	10.28	16.53	23.67	6.75
	G-8	**6.68**	**8.79**	**7.38**	**5.96**
CSFL	2016-17	8.07	3.90	3.55	2.11
	2017-18	7.00	7.89	10.00	8.33
	2018-19	**6.43**	**7.94**	**7.32**	**4.55**
BN cross	2016-17	10.74	9.65	5.82	2.11
	2017-18	6.60	10.30	9.47	7.16
	2018-19	**5.02**	**7.61**	**6.86**	**6.20**
Pratapdhan (BNR cross)	2016-17	7.75	7.59	5.57	-
	2017-18	6.75	8.26	15.70	6.96
	2018-19	**3.25**	**3.62**	**7.35**	**4.48**

Table 89.Growth and production performance of *Mewari* in different generations

Traits		*G-8*		*G-7*	
		N	Mean±SE	N	Mean±SE
Body weight (g)	day old	2406	31.8±0.12	2339	31.36± 0.1
	8 wks	1229	640.9±3.81		630±3.21
	20 wks	627	1445±10.72	868	1436±9.40
	40 wks	351	1628±19.72	370	1670±21.53
ASM (d)			163.72		159.31
Egg weight (g)					
	28 wks	388	42.60 ± 0.20	401	42,36 ± 0.16
	40 wks	346	45.71 ± 0.21	280	46.19 ± 0.18
EP 40 wks (Nos.)					
	HH		37.31		28.94
	HD		41.42		41.26
	Survivors'		45.49		107.32
EP 52 wks (Nos.)					
	HH		58.82		37.26
	HD		69.23		67.34
	Survivors'		78.48		138.18
EP 72 wks (Nos.)					
	HH		-		43.40
	HD		-		98.22

Evaluation of *Pratapdhan*

E-7 generation of *Pratapdhan* was evaluated from 28 to 72 weeks of age while E-8 generation was evaluated up to 20 weeks of age (Table 90). There was no change in egg weight recorded at 40 weeks of age in the present generation. However, hen housed and survivors' egg production up to 40 weeks of age increased as compared to previous evaluation.

Germplasm supply

A total of 76,681 germplasm (74,002 live birds and 2,679 fertile eggs) was supplied during the current year.

Revenue generation

The centre realized a receipt of Rs. 14.90 lakhs during the current financial year, which was 84% of the expenditure on feed cost (Rs. 17.64 lakhs).

Table 90. Growth and production performance of *Pratapdhan* in different evaluations

Traits	*Pratapdhan*			
	E-5	E-6	E-7	E-8
Body weight (g)				
day old	40.31±0.11	38.23±0.19	39.02 ± 0.13	38.77 ± 0.14 (400)
2 wks	169.7±1.16	126.6±0.58	147.69 ± 1.10	140.0 ± 0.90 (383)
4 wks	326.35±2.56	295.1±2.18	378.11 ± 3.47	355.0 ± 4.15 (348)
8 wks	693.4±5.31	646.7±8.09	963 ± 11.94	870.1 ± 7.56 (321)
20 wks*	1721±21.71	1911±27.61	1927 ± 15.70	1961 ± 12.53 (178)
AFE (d)	127	138	134	-
ASM (d)	144.5±0.55	157.6±0.78	157.61±0.78	-
Egg weight (g)				
28 wks	47.13±0.18	47.74±0.22	47.27± 0.27	-
40 wks	53.79±0.11	53.13±0.31	52.57±0.21	-
EP 40 wks (Nos.)				
HD	80.86	65.17	62.26	-
HH	62.91	49.91	52.35	-
Survivors'	-	72.84	77.84	-
EP 52 wks (Nos.)				
HD	105.01	103.1	100.42	-
HH	75.59	74.6	72.34	-
Survivors'	-	117.3	152.72	-
EP 72 wks (Nos.) HD	170.89	167.5	166.10	-
HH	96.29	100.2	100.28	-

*Values for females only from 20 weeks onwards, before 20 weeks in pooled sex; Values in parenthesis are number of observation

CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur (Himachal Pradesh)

Programme activity assigned

- Collection and evaluation of the local native chicken.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition.
- Production and evaluation of crosses of local native chicken with improved germplasm.

Action taken

- In native germplasm, G-6 generation was evaluated up to 52 weeks of age and G-7 generation was produced and it is being evaluated.
- The *Dahlem Red* (G-6) population was evaluated up to 52 weeks of age and G-5 generation was evaluated from 52 to 72 weeks of age.
- The *Dahlem Red* X Native (DN) cross was produced and evaluated up to 72 weeks of age.
- The chicks of *Himsamridhi* (DND cross) was produced and evaluated at farm and field level up to 52 weeks of age for growth and production parameters.
- *Himsamridhi* (DND cross) birds from previous year completed evaluation from 52 to 72 weeks of age at farm and field level.

Achievements

Native germplasm

A total of 6399 native chicks (G-7 generation) were produced at hatchery by collecting fertile eggs from farm. Heritability estimate in native population (G-6) from sire component for body weight at 8, 12 and 20 weeks of age were 0.15±0.06, 0.21±0.09 and 0.12±0.08, respectively.

Improved germplasm

The G-6 generation of *Dahlem Red* population was evaluated up to 52 weeks of age and G-5 generation from previous year was evaluated from 52 to 72 weeks of age**.**

Incubation records

The summary of incubation records for various pure lines and crosses is presented in Table 91. The fertility improved in native, *Dahlem Red* and DND cross over previous year and it ranged between 85.75% (DNXD) to 86.48% (native). The hatchability ranged from 66.08 to 72.17% on TES and 76.65 to 83.45% on FES basis. Both the TES and FES hatchability improved over previous year in all the populations except for DN cross. The hatchability was comparatively lower in *Dahlem Red* (DR) population (66.08% and 76.65% on TES and FES basis) compared to overall average of 69.72% on TES and 81.08% on FES. Over all fertility was good but hatchability needs further improvement in *Dahlem Red*.

Mortality

The chick mortality during 0 to 6 weeks of age ranged from 5.59 to 9.74% during this year (Table 92). The mortality during 7 to 20 weeks of age ranged from 3.66 to 14.55%. The mortality during 21 to 40 weeks ranged from 2.89 to 4.73% in different stocks/ populations. Most of the mortality was due to non-specific causes like chilling, overcrowding / huddling and killing by rodents. Mortality during different periods compared to previous years was higher which needs to be controlled for better performance.

Performance evaluation of germplasm

The performance of *Dahlem Red,* native, DRXN and *Himsamridhi* (DND cross) populations were evaluated (Table 93). The average egg weight (40 week) was 52.35±0.26, 45.95±0.18 and 51.30±0.12 g in *Dahlem Red,* Native and DN population. The egg weight for *Dahlem Red* and native eggs was similar to previous generation. The native germplasm (G-6 generation) completed evaluation up to 52 weeks of age. The DN cross has completed evaluation up to 72 weeks of age. The egg production up to 40 and 52 weeks of age showed improvement in native and *Dahlem Red* populations as compared to previous year.

Evaluation of *Himsamridhi*

Himsamridhi (DNXD cross) was evaluated under farm and field conditions up to 72 weeks of age (Table 94). The body weight recorded at 20 and 40 weeks of age showed improvement as compared to previous generation. Egg production up to 40 and 52 weeks of age also improved at farm condition as compared to previous evaluation. The HHEP up to 72 weeks of age at field condition was 145.6 eggs/bird.

Table 91. Summary of incubation and hatching in different populations

Strain/ cross	Year	No. of egg set	Fertility (%)	Hatchability (%)		No. of good chicks
				TES	FES	
Native	G5	9790	85.17	57.89	67.96	5668
	G6	13199	76.80	54.60	71.55	7207
	G7	**8866**	**86.48**	**72.17**	**83.45**	**6399**
Dahlem Red	G4	916	64.41	18.23	28.30	167
	G5	3484	83.18	62.05	74.60	2162
	G6	**12302**	**86.21**	**66.08**	**76.65**	**8130**
DN cross	2016-17	8438	87.22	66.81	76.60	5638
	2017-18	2619	94.23	84.49	89.66	2213
	2018-19	**7328**	**86.36**	**69.81**	**80.83**	**5116**
Himsamridhi (DNXD cross)	2016-17	50724	81.33	54.10	66.51	27443
	2017-18	29261	70.18	49.89	71.09	14600
	2018-19	**42815**	**85.75**	**70.24**	**81.91**	**30075**

Table 92. Mortality (%) of birds at different ages

Strain/ cross	Year	Mortality (%)		
		0-6 wks	7-20 wks	21-40 wks
Native	G5	11.72	20.95	3.20
	G6	21.52	13.92	9.31
	G7	**7.92**	**6.81**	**3.58**
Dahlem Red	G4	3.12	4.36	10.40
	G5	10.63	11.51	10.50
	G6	**5.59**	**10.63**	**3.95**
DN cross	2016-17	13.20	4.14	3.84
	2017-18	21.86	22.47	12.26
	2018-19	**7.61**	**14.55**	**4.73**
Himsamridhi (DNXD cross)	2016-17	18.71	12.79	5.00
	2017-18	24.69	4.59	4.04
	2018-19	**9.74**	**3.66**	**2.89**

Table 93. Growth and production traits of different breeds/strains

Traits	*Dahlem Red*		Native		DN cross	
	N	Mean ±SE	N	Mean ± SE	N	Mean ± SE
Body weight (g) at						
day old	1231	36.7±0.29	845	31.3±0.26	279	35.2± 0.20
4 wks	1158	245.9±3.24	804	217.0±1.68	246	230.5±6.25
8 wks	1063	617.1±13.7	745	530.3±17.9	196	560.9±14.2
20 wks	470	1561±14.2	351	1480±22.5	169	1510±15.4
40 wks	464	1628±12.2	306	1524±20.8	79	1590±14.6
FCR (0-8 wks)	1063	4.06	745	4.75	196	4.50
ASM (d)	460	176	316	193	78	185

Traits		*Dahlem Red*		Native		DN cross	
		N	Mean ±SE	N	Mean ± SE	N	Mean ± SE
Egg weight (g)	28 wks	150	49.25± 0.15	100	41.05±0.13	50	48.50±0.10
	40 wks	150	52.35±0.26	100	45.95±0.18	50	51.30±0.12
EP 40 wks (Nos.)	HH	464	86.49	351	45.22	79	67.69
	HD	451	88.32	319	48.60	77	69.45
	Survivors'	445	90.35	306	50.87	76	70.36
EP 52 wks (Nos.)	HH	464	144.01	186	78.07	79	102.45
	HD	447	148.35	171	84.31	76	105.72
	Survivors'	430	152.50	161	90.53	75	107.92
EP 72 wks (Nos.)	HH	464	214.10		*under	79	155.41
	HD	440	225.27		evaluation	64	166.95
	Survivors'	415	236.35			63	194.88

Table: 94. Performance of *Himsamridhi* (DND) at farm and field level

		Farm		Field	
		N	Mean ± SE	N	Mean ± SE
Body wt (g) at	day old	492	34.9±0.26	-	-
	4 wks	387	238.2±4.86	850	205.3±3.15
	8 wks	271	543.6±8.61	600	440.3±7.63
	20 wks	133	1512±14.23	400	1359±12.50
	40 wks	130	1590±14.60	290	1582±21.67
FCR (0-4 wks)		466	3.39	-	-
ASM (d)		133	170	280	215
Egg weight (g) at	28 wks	50	49.46± 0.50	100	49.40±0.23
	40 wks	50	50.95± 0.20	50	50.70±0.32
EP 40 wks (Nos.)	HH	133	82.69	300	45.60
	HD	132	83.23		
	Survivors'	130	84.60		
EP 52 wks (Nos.)	HH	133	130.83	250	98.65
	HD	129	133.03		
	Survivors'	126	140.38		
EP 72 wks (Nos.)	HH		under evaluation	150	*Previous year stock
	HD				
	Survivors'				145.65

Germplasm supply

During the year, the centre supplied 44,584 chicks/ growers of *Himsamridhi*, native and other crosses to farmers (631 farm units).

Revenue generation

The centre realised receipts of Rs 13.19 lacks during the financial year on account of sale of various poultry products (chicks, eggs, culled birds) which was 69.8% of expenditure on feed cost (Rs 18.90 lacks).

ICAR- Directorate of Poultry Research, Hyderabad (Telangana)

Programme activity assigned

- Maintenance and evaluation of random-bred control population for egg
- Maintenance and evaluation of random-bred control population for meat
- Supply of control population stocks to all AICRP centres except ICAR-CARI, Izatnagar.

Action taken

- The random-bred control populations for egg and a new synthetic coloured control population for meat were regenerated.
- Hatching eggs from layer and meat control populations were made available to different AICRP centres during the year.

Details of the implementation of programme and results achieved

I) Maintenance and evaluation of random bred control population for egg

During 1996-97, the existing layer control population was replaced with the approval of the research advisory committee, as it had low egg weight and was having high mortality. A synthetic population that was originated from the AICRP and commercial populations at GAU, Anand was considered to be useful for this purpose and in the population available at PD on Poultry was under a mild positive selection for egg production. The selection was relaxed and mating was arranged among 70 randomly chosen males and 350 randomly chosen females to reproduce the base generation of the layer control LC-0. The LC-1 was reproduced with 60 sires and 300 dams in two hatches. The LC-2 generation was reproduced utilizing 40 sires and 200 dams in three hatches. The LC-4, LC-5, LC-6, LC-7 and L-8 generations were reproduced using 40 sires and 200 dams. LC-9 and LC-10 generation was reproduced using 32 sires and 128 dams and 37 sires and 74 dams, respectively. From LC-11 generation was reproduced with 50 sires and 200 dam. The inbreeding coefficient was kept at minimum level. At the time of housing only two males per sire family and two females per dam family were housed for recording of production and other body weight traits according to the technical programme.

Regeneration of LC-14 generation

The number of sires and dams used to regenerate LC-14 generation, effective population size and rate of inbreeding are presented in Table 1. The effective population size for LC-12 was 80 and inbreeding coefficient was 0.0062 (Table 95).

Table 95. Number of sires and dams, effective population size and rate of inbreeding over generations

Gen.	No. of Sires	No. of Dams	Effective population size (Ne)	Rate of inbreeding (ΔF)
LC-7	40	200	133.33	0.00250
LC-8	40	200	133.33	0.00250
LC-9	32	128	102.40	0.00488
LC-10	37	74	98.66	0.00507
LC-11	50	200	160.00	0.00313
LC-12	50	200	160.00	0.003
LC-13	40	200	133.33	0.00250
LC-14	25	100	80.00	0.0062

Incubation records

Incubation records of LC-14 generation in layer control population have been presented in Table 96. Fertility, hatchability on total eggs set and hatchability on fertile eggs set respectively were 81, 68 and 82%. Fertility and hatchability on TES decreased in the current generation as compared to previous generation.

Table 96. Incubation records layer control population

Generation	Fertility (%)	Hatchability (%)	
		FES	TES
LC-7	81.5	89.3	66.2
LC-8	78.5	91.6	71.9
LC-9	85.1	92.3	78.5
LC-10	70.2	84.2	59.1
LC-11	70.9	87.0	61.7
LC-12	62.0	85.0	53.0
LC-13	59.2	47.8	80.7
LC-14	81	68	82

Production performance

During the year 2018-19, the birds of LC-13 generation were evaluated up to 72 weeks of age. The

performance of control population and their regression value (time trend of control) has been presented in the following Table 97. The traits like body weight at 16 and 40 weeks of age, age at sexual maturity, 40 weeks egg weight and egg production to 40 weeks and 64 weeks (up to LC-13) showed non-significant change and the control population appears to be stable for all the traits for last eleven generations.

Table 97. Performance of layer control population for growth and production traits

Gen.	Body weight (g)		ASM (days)	Egg weight 40 wks (g)	Egg Production (Nos.)	
	16 wks	40 wks			40 wks	64 wks
LC-7	978	1511	148.1	50.90	93.13	189.1
LC-8	1010	1473	151.6	52.65	85.44	173.1
LC-9	1048	1510	154.9	52.91	91.47	200.7
LC-10	954	1508	155.4	53.28	92.64	194.4
LC-11	886	1497	156.4	51.28	94.90	223
LC-12	914	1522	150.1	52.88	98.00	224
LC-13	880	1492	150.6	51.11	107.69	221
LC-14	885	-	155.0	-	-	-
b±S.E	-21.08* ±6.17	1.01^{NS} ±3.29	0.35^{NS} ±0.49	-0.02^{NS} ±0.21	2.57^{NS} ±0.83	7.87±2.07*

II) Maintenance and evaluation of random bred control population for meat

During the period G-17 generation of the control broiler was evaluated for juvenile traits and G-16 generation for production traits.

Incubation records

Incubation records of G-17 generation in broiler control population have been presented in Table 98. Percent fertility, percent hatchability on total eggs set and percent hatchability on fertile eggs set respectively were 88.64, 79.86 and 90.10. Both fertility and hatchability were improved in the current generation as compared to previous generation.

Table 98. Incubation records broiler control population

Generation	Fertility (%)	Hatchability (%)	
		TES	FES
G-16	78.99	71.93	91.06
G-17	88.64	79.86	90.10

Juvenile body weights

Performance of juvenile traits in control broiler population over 17 generation is presented in Table 99. During the current generation body weight at 5 and 6 weeks were 740 and 930g, respectively. After six weeks of age 500 female chicks and 150 male chicks representing all the sires and dams were saved and were being maintained under restricted feeding schedule. At the time of housing only 2 males per sire family 2 females per dam family were housed for recording of production traits. The regression estimates of generation mean on generation number for 5and 6 weeks body weight showed non-significant changes over generations indicating the stability of the broiler control population for juvenile body weights.

Table 99. Performance of juvenile body weights in broiler control population

Generation	BW 5 wks (g)	BW 6 wks (g)
G-1	822	1060
G-2	872	1141
G-3	731	995
G-4	897	1195
G-5	907	1106
G-6	672	891
G-7	592	783
G-8	929	1215
G-9	626	964
G-10	578	829
G-11	522	720
G-12	731	1156
G-13	573	993
G-14	520	663
G-15	570	836
G-16	734	951
G-17	740	930
b±S.E	-15.00^{NS}±6.00	-15.08^{NS} ±7.53

Production Traits

A total of 300 females were maintained till 40 weeks of age to record the traits like age at sexual maturity, body weights at 20 and 40 weeks of age, egg weight at 32 and 40 weeks of age and egg production to 40 weeks of age. The mean for all these traits were presented in Table 100. The hatching eggs of this population were being supplied to the AICRP centers as and when they require for evaluation of their selected lines. The consolidated production performance of broiler control over generations has been presented in the following Table (100). The regression estimates of generation means on generation number (G-0 to G-16) showed non-significant changes over the generations in all the traits indicating the stability of the broiler control.

Table 100. Growth and production performance of broiler control population over generations

Gen.	BW 20 wks (g)	BW 40 wks (g)	ASM (d)	EW 32 wks (g)	EW 40 wks (g)	EP 40 wks (Nos.)
G-0	2509	3150	177	54.02	60.50	47.00
G-1	2536	3256	164	52.00	54.90	45.90
G-2	2776	3370	163	51.07	57.55	66.67
G-3	2670	3487	162	53.32	58.09	65.37
G-4	2591	3478	163	53.99	58.12	65.07
G-5	2559	3524	162	51.56	54.67	57.47
G-6	2130	2886	173	53.06	58.87	58.65
G-7	2457	3335	165	53.39	56.61	57.27
G-8	2436	3222	167	54.32	57.00	60.00
G-9	1941	3005	171	51.44	57.28	53.38
G-10	1982	2799	194	51.66	55.10	57.06
G-11	1885	2933	189	51.40	57.27	54.30
G-12	2369	3139	170	52.20	56.43	56.59
G-13	2279	3033	174	50.96	55.80	55.82
G-14	2416	3151	182	52.50	56.20	56.59
G-15	2296	3098	182	51.23	58.68	56.0
G-16	2474	2848	181	52.68	58.42	56.99
b±S.E	-24.01^{NS} ±11.55	-26.32^{NS} ±9.43	1.19^{NS} ±0.04	-0.077^{NS} ±0.05	-0.038^{NS} ±0.079	-0.019^{NS} ±0.28

Critical Observations

KVASU, Mannuthy

Accomplishments and achievements

- This centre has evaluated the S-3 generation of native chicken up to 40 weeks of age and IWN (S-30) and IWP (S-30) were evaluated for production traits up to 64 weeks of age and their crosses.
- IWN X Native (ND) was produced and evaluated up to 72 weeks and the cross of ND male with RIR female (NDR) have been produced and evaluated in farm condition up to 72 weeks of age.
- Hen housed egg production up to 40 weeks of age has improved significantly in S-3 generation by 3.24 numbers
- The hen day egg production up to 64 weeks of age in S-30 generation increased by 3 eggs in IWN line.
- Hen housed egg production recorded up to 72 weeks of age was 300.3 and 302.98 eggs in IWN and IWP strains respectively.
- The centre has generated highest revenue of Rs. 35.01 lakhs, which was 130.6 % of the total expenditure on feed.
- The centre has supplied 1,33,829 number of germplasm during the year.

Short fall

- Egg production in IWN & IWP decreased.

Suggestions

- All precaution to be taken for improvement in egg production.

AAU, Anand

Accomplishments and achievements

- This centre has evaluated S-2 generation of native birds, S-0 generation of RIR, F_1 cross (IWN X Native) for production traits up to 64 weeks of age and three way cross (F_1 X RIR) up to 40 weeks of age.
- Egg production upto 64 weeks of age was 194.4 in F_1 cross (IWN X Native) and 176.3 in three way cross (F_1 X RIR), respectively.
- S-0 generation of IWN and IWP strains (new stock) along with control layer population was evaluated up to 64 weeks of age.
- Hen housed egg production up to 64 weeks of age was higher in IWN (263.6) than IWP (250.5) line.
- The centre has also evaluated S-7 generation of IWD and IWK strains up to 64 weeks of age.
- The centre has generated the revenue of Rs. 26.16 lakhs which was 86.36% of the expenditure on feed cost.
- The centre supplied a total of 46983 number germplasm during the present year.

Short fall

- Mortality of F1 cross was higher during 17-64 weeks of age (22.94%).
- Germplasm supply was less compared to previous year.

Suggestions for further improvement

- Efforts should be made to increase the germplasm supply.
- The standard of reporting of results needs to be improved.
- Strickly follow the technical programme as per the recommendation of annual review meeting.

KVAFSU, Bengaluru

Accomplishment

- Evaluated the performance of local (S-2), PB-1 (S-11), PB-2 (S-24) and F1 X PB-2 cross for economic traits.
- Body weight at 8, 12 and 20 weeks of age was 455.1, 786.7 and 1270 g, respectively in local chicken (S-2). The average age at sexual maturity was 165.7 days.
- Body weight at 8 weeks in F1 X PB-2 cross in males and females were 1,255 and 1,106 g, respectively with FCR (0-8 wks) of 2.72.
- Egg production up to 40 weeks of age in PB-1, PB-2 and Control lines were 63.81, 61.25 and 63.48 eggs, respectively.
- A total of 1,95,817 germplasm were supplied to 365 beneficiaries. The efforts of the PI and Team are commendable.
- During the year 2018-19, the centre generated revenue of Rs. 52.32 lakhs which is 169% of expenditure on feed cost.

Shortfalls

- Hatchability on TES needs improvement.

Suggestions

- Genetic parameters may be estimated and presented for important traits.

GADVASU, Ludhiana

Accomplishment

- Evaluated the performance of native (*Punjab Brown*), PB-1 (S-11), PB-2 (S-43) and crosses (PB-2 X desi) for economic traits.
- Body weight of *Punjab Brown* at 8 and 20 weeks were 765 and 2,143 g, respectively.
- Average body weight at 5 weeks of age was 1166, 1071 and 826 g in PB-1, PB-2 and Control lines, respectively.
- Egg production up to 40 weeks of age in PB-1, PB-2 and Control lines were 64.66, 68.61 and 55.36 eggs, respectively.
- Genetic response over last 12 generations for 5 week body weight was 20.65 g in PB-1 and 11.52g in PB-2 population.
- A total of of 1,02,049 germplasm were supplied to 300 beneficiaries.
- During the year 2018-19, the centre generated revenue of Rs.25.51 lakhs which is 90% of expenditure on feed cost.

Shortfalls

- Growth and egg production performance of PB-2 X desi in farm was reduced compared to previous evaluation.

Suggestions

- Breeding programme should be oriented towards *Punjab Brown*.

CARI, Izatnagar

Accomplishment

- Evaluated the performance of native, CSML (S-17), CSFL (S-17) and CSNL X Desi cross for economic traits.
- Body weight of local native chicken germplasm (S-3) at 6, 8 and 12 weeks age was 504.6, 683.2 and 1,140 g, respectively.
- Body weight of CSML x desi chicks at 6, 8 and 12 weeks were 1,065, 1,369 and 1,847 g, respectively.
- The body at 5 week in CSML, CSFL and control lines were 1,220, 1,208 and 732.6 g, respectively.
- The phenotypic response of body weight at 5 weeks per generation was 14.77 and 15.13 g in CSML and CSFL, respectively. The genetic response was 14.69 and 15.01g, respectively.
- A total of 51,388 germplasm were distributed. Revenue generation was Rs.8.02 lakhs.

Shortfalls

- Mortality is higher during grower phase.
- Hatchability on TES needs improvement.
- Germplasm supply was low

Suggestions

- Proper biosecurity needs to be maintained in the farm to reduce the mortality.
- Efforts should be made to improve the germplasm supply

OUAT, Bhubaneswar

Accomplishment

- Evaluated the performance of *Hansli* (S-3), CSML (S-7), CSFL (S-7), F1 cross and triple cross for economic traits.
- Body weight at 8 week of *Hansli* (S-3) was 587 g. The egg production up to 40 week in *Hansli* (S-2) was 23.14 eggs.
- Body weight at 8 weeks of triple crosses, CSML X *Hansli* X CSFL and *Hansli* X CSML X CSFL were 1,843 and 2,177 g, with FCR of 2.78 and 2.39, respectively.
- Body weight at 5 weeks of CSFL and CSML was 1,025 and 1,129 g, respectively.
- Egg production up to 40 and 52 weeks was 52.39 and 84.18 eggs, respectively in CSFL line.
- Centre has supplied 18,810 day old chicks to farmers and generated revenue of Rs. 4.44 lakhs, which is 31 percent of total feed cost.

Shortfalls

- Centre needs to report the egg production performance of control population
- Germplasm supply and revenue generation was low.

Suggestions

- PI advised to provide the complete data of control population along with CSML and CSFL.
- Efforts should be made to improve the germplasm supply and revenue generation.

ICAR RC, Agartala

Accomplishment

- Centre evaluated Tripura Black, *Dahlem Red*, broiler dam line, BN cross and three-way cross (BND).
- Body weight at 20 weeks was 1,116, 1,601, 2,789 and 1,593 g in Tripura Black, *Dahlem Red*, coloured broiler dam line and BN cross, respectively.
- Body weight at 8 weeks of BND cross was 499 and 403 g in farm and field, respectively.
- The 52 week egg production in BND cross was 94.8 and 82.75 eggs under farm and field, respectively.
- A total of 25,275 germplasm were supplied to 300 beneficiaries.
- Centre generated revenue of Rs. 10.26 lakhs which is 58 % of expenditure on feed cost.

Shortfalls

- Location specific variety not yet developed.
- Progress will be reviewed and appropriate decision will be taken for further continuation of the centre.

Suggestions

- Efforts should be made to developed location specific variety.

NDVSU, Jabalpur

Accomplishment

- Evaluated the performance of *Kadaknath* (G-9), Jabalpur Colour (JBC) (G-9), CSFL and *Narmadanidhi* and maintained M-1and M-2 populations.
- The 6 week body weight was 342.3 and 803.7g in *Kadaknath* and Jabalpur population.
- The hen housed egg production up to 40 weeks of age was 91.9 eggs in JBC and 57.3 eggs in *Kadaknath*. Hen day egg production up to 40 weeks was 95.7 and 60.5 eggs, respectively.
- In CSFL 40 week egg weight and production was 60.80 g and 59.0 eggs, respectively.
- *Narmadanidhi* produced 49, 88.1 and 176 eggs up to 40, 52 and 72 weeks, respectively in field conditions.
- A total of 56,432 germplasm were supplied to 184 beneficiaries.
- Centre generated revenue of Rs. 20.67 lakhs which is 115% of expenditure on feed cost.

Shortfalls

- The hatchability on fertile eggs set reduced in JBC and CSFL lines.
- Germplasm supply was low.

Suggestions

- Efforts should be made to improve the germplasm supply.

AAU, Guwahati

Accomplishments and achievements

- Guwahati centre evaluated native, PB-2, Dahlem Red and BN cross and *Kamrupa* up to 52 weeks of age at farm condition.
- The BND cross (*Kamrupa*) was evaluated up to 52 weeks of age at farm and field conditions.
- The centre realized revenue of Rs. 6.26 lakhs during the financial year which is 51.77% of expenditure on feed cost.
- The centre supplied 30720 germplasm to farmers.

Short falls

- The results of the present generation of native, PB-2 and *Dahlem Red* needs to be compared with the performance of their respective population in the previous generation. Accordingly the improvement and decline in the performance needs to be highlighted and discussed in the report.
- Germplasm supply was low.

Suggestions for further improvement

- Efforts should be made to increase the germplasm supply and revenue generation.
- The standard of reporting of results of centre needs to be improved (Annual Report).

BAU, Ranchi

Accomplishments and achievements

- The centre evaluated G-6 generation of native population, *Dahlem Red* and *Jharsim*.
- Centre supplied 25323 Nos. germplasm to the farmers.
- The centre realized a receipt of Rs. 6.70 lakhs during the financial year which was 87.29% of expenditure on feed cost.

Short falls

- The mortality figures for PB-2 x desi cross during 0-6 and 7-20 weeks of age is not provided.

- Body weight in native germplasm declined compared to previous generation.
- The performance of *Jharsim* at field condition is not given as suggested in previous year.
- Despite increase in the quantum of germplasm supplied, the revenue generation has declined in the present year compared to previous year.
- Progress will be reviewed and appropriate decision will be taken for further continuation of the centre.

Suggestions

- Egg production needs to be improved by monitoring feed quality and lighting management.
- *Jharsim* should be evaluated in the field.
- Efforts should be made to improve the germplasm supply and revenue generation.
- Efforts should be made to improve the standard of reporting the results for Annual Report of the centre.
- Progress will be reviewed and appropriate decision will be taken for further continuation of the centre.

MPUAT, Udaipur

Accomplishments and achievements

- *Mewari* (G-8) and *Pratapdhan were* evaluated during the year.
- RIR and CSFL populations were regenerated and being maintained at the centre
- A total of 76681 germplasm was supplied.
- The centre realized a receipt of Rs. 14.90 lakhs during the current financial year which is 95.23% of expenditure on feed cost.

Short falls

- Both germplasm supply and revenue generation of the centre was less compared to the previous year.
- The performance of RIR and CSFL population maintained at the centre is not given.

Suggestions

- Efforts should be made to improve the germplasm supply.
- Efforts should be made to improve the standard of reporting the results of the centre (Annual Report).

CSKHPKVV, Palampur

Accomplishments and achievements

- Centre has evaluated native (G6), *Dahlem Red* and DN cross, populations for growth and production traits.
- *Himsamridhi* (DND cross) was evaluated at farm and field level up to 52 weeks of age for growth and production traits.
- A total of 44584 germplasm supplied.
- The centre generated revenue of Rs. 13.19 lakhs which is 69.78% of the expenditure on feed cost.

Short falls

- The results on the performance of the present generation of native and *Dahlem Red* populations need to be compared with the performance of their respective population in the previous generation.
- Mortality during 7-20 weeks of age was high in *Dahlem Red* and DN cross.

Suggestions

- Efforts should be made to improve the germplasm supply and revenue generation.

Poultry Seed Project

History

Directorate of Poultry Research has developed three promising chicken varieties, *Vanaraja, Gramapriya* and *Srinidhi* which are popular for their better growth and production than the native chicken in the rural and tribal areas. All these birds gained wider acceptability in almost all states of the country. Due to the limited facilities available with the Directorate for supply of these chicken varieties across the country and also difficulties involved in transportation of chicks and fertile eggs throughout the country, necessity was felt to establish rural chicken germplasm multiplication units across the country.

Indian Council of Agricultural Research initiated the Poultry Seed Project with a sole aim to provide the improved chicken varieties to all parts of the country through collaborative efforts involving state agricultural/veterinary universities, line departments and ICAR institutes. Six centres were sanctioned in XI plan and further strengthened in XII plan by adding another five centres. During the present EFC three centres were added and two centres were discontinued from 2017-18.

Objectives:

- Production of around 0.3-1.0 lakhs improved poultry seed per identified centre/state per annum to distribute them in respective areas.
- Capacity building in SAUs/ICAR Institutes to produce poultry seed at each centre on its own.

Centres

Considering the advantages of establishing seed (fertile eggs / chicken) multiplication units, the Indian Council of Agricultural Research has initiated and sanctioned "Poultry Seed Project" during the XI five year plan. Initially six centres were sanctioned, three in the NE region and three in the main land and further strengthened with five more centres during XII plan as indicated below (Table 1). One non funded centre has also started during the XII plan.

Table 1. Centres in operation under Poultry Seed Project

S.No	Centre	State
1	West Bengal University of Animal and Fishery Sciences, Kolkata	West Bengal
2	Bihar Animal Sciences University, Patna	Bihar
3	Regional Centre, ICAR Research complex for NEH Region, Jharnapani,	Nagaland
4	ICAR-National Organic Farming Research Institute, Gangtok	Sikkim
5	Regional Centre, ICAR Research complex for NEH Region, Imphal	Manipur
6	Tamil Nadu Veterinary and Animal Sciences University, Hosur	Tamil Nadu
7	ICAR-Central Coastal Agricultural Research Institute, Panji	Goa
8	ICAR-Central Island Agricultural Research Institute, Port Blair,	A & N Islands
9	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	Jammu & Kashmir
10	PVNR Telangana Veterinary University, Warangal	Telangana
11	Sri Venkateswara Veterinary University, Tirupati,	Andhra Pradesh
12	ICAR Research Complex for NEH Region, Umiam	Meghalaya

Technical Program

- Technical program envisaged for all the centres is same except for the target of supplying chicks/ fertile eggs.
- All the centres will procure parents (males of male line and females of female line) of improved chicken germplasm (*Vanaraja*, *Gramapriya* and *Srinidhi*) from the ICAR-Directorate of Poultry Research, Hyderabad. Day old parent chicks will

be reared under standard management practices as per guidelines provided in the breeder manual supplied by the Directorate at the respective centre.

- Adult male and females parent birds will be reared to produce fertile hatching eggs. Day old chicks of the improved germplasm will be hatched and will be reared in the nursery unit or sold to NGOs/ KVKs/farmers for nursery rearing up to 6 weeks of age. The chicks in the nursery unit will be provided with feed, medication, vaccination, brooding, and health care. After the nursery phase, the chicks will be distributed to the individual farmers on cost basis. Wherever possible, the day old chicks / fertile eggs of improved chicken varieties may be distributed to the individual farmers / extension agency / NGO / KVK, who has the facility to grow the birds up to 6 weeks of age in the nursery unit. These birds may be further distributed to the individual farmers at the rate of 10-15 birds per person.
- To know the performance of the birds at farmer's field recording of body weight at 4 weeks intervals during growing (7-20 weeks) will be done. Egg production and egg weight at every 14 day intervals during egg laying period (21-72 weeks) will be recorded.
- Analysis, documentation and reporting of the data at regular intervals.

Table 2. Targets and achievement of germplasm supply (number per year) for different centres

S.No	Centre	Target	Achievement
1	West Bengal University of Animal and Fishery Sciences, Kolkata	1,00,000	92,848
2	Bihar Animal Sciences University, Patna	70,000	69,179
3	Regional Centre, ICAR Research complex for NEH Region, Jharnapani	70,000	83,508
4	ICAR-National Organic Farming Research Institute, Gangtok	40,000	89,495
5	Regional Centre, ICAR Research complex for NEH Region, Imphal	60,000	79,425
6	Tamil Nadu Veterinary and Animal Sciences University, Hosur	1,00,000	1,42,674
7	ICAR-Central Coastal Agricultural Research Institute, Panji, Goa	50, 000	1,220
8	ICAR-Central Island Agricultural Research Institute, Port Blair	50,000	21,009
9	PVNR Telangana Veterinary University, Warangal	50, 000	10,223
10	Sri Venkateswara Veterinary University, Tirupati	50, 000	35,483
11	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	50,000	37,630
12	ICAR Research Complex for NEH Region, Umiam	50,000	30,206

West Bengal University of Animal & Fishery Sciences, Kolkata

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grown up chicks of rural chicken varieties.
- Recording the growth, production, fertility and hatchability in parents.
- Collection of data on growth and production parameters from farmer's fields.
- Analysis, documentation and reporting of the data.

Work done

An overhead water tank with water treatment plant of 500 liter per hour capacity (ultra-filtered, turbidity controlled, reverse osmosis) with automatic controls and automatic supply to individual drinker was constructed. The plinth protection of all farm buildings were repaired and renovated. The waste water and rain water drainage system of breeding farm was realigned. Hatchery and chick handling rooms were repaired and repainted.

Parent stock

Eight batches of *Vanaraja* parents were reared during the year, out of which, five are in laying, and three batches were culled after the end of economic laying. A total of 1043 female and 175 male breeding parents of *Vanaraja* are in position at present, excluding the birds of growing and brooding phase. The chicks were fed *ad libitum* till 6 weeks of age with balanced diet; thereafter feed restriction schedule was followed as per the breeder manual to maintain the body weight during the laying period. The average body weight at 20 weeks of age in female and male parents was 1915 and 2125 g, respectively (Table 3). The body weight is almost similar to the standard target body weight, indicating good feeding and management practices in the farm including feed restriction.

Table 3. Body weight (g) of *Vanaraja* parent stock

Age (wks)	Male	Female
4	403	385
5	950	845
12	1500	1350
20	1800	1505

Egg production

Average age at first lay has been recorded as 175 days (25 weeks) with a range of 154 -210 days across the batches. Average HDEP ranged from 8.3% at 25 weeks of age to 79.6% at 48 weeks of age (Table 4). The egg production of 50% was achieved at the age of 31 weeks and maintained the rate of production up to 67 weeks, and in between from 36 weeks to 50 weeks of age, more than 60% egg production was recorded. Thus, persistency of egg production in the centre is good indicating ideal management practices resulting in optimum production from the birds. Average egg weight at 40 and 72 weeks of age was 50.68 and 59.25 g, respectively. The egg weight increased according to the advancement of age of birds (Table 4), which followed the normal physiological norms of poultry birds.

Table 4. Egg production performance (HDEP) in *Vanaraja* parents

Age (wks)	Egg production (HDEP %)	Egg weight (g)
28	27.85	46.18
36	58.40	50.90
40	60.95	50.68
52	59.22	57.08
64	55.82	58.76
72	41.93	59.25

Hatching Performance

Hatching performance of *Vanaraja* parents in terms of fertility and hatchability is presented in Table 5. The average fertility was 89.53% with a range from 86.28% (at 28 weeks of age) to 91.16% (at 40 weeks of age). Hatchability on total eggs set (TES) and fertile eggs set (FES) was consistent throughout the life cycle reaching upto 81.52% (TES) and 88.32% (FES). Fertility and hatchability rates were in optimum range indicating good hatchery practices.

Germplasm supply

A total of 92,848 day old chicks (DOCs) of *Vanaraja* were distributed to the farmers in various parts of West Bengal during the year 2018-19. The beneficiaries were poultry farmers directly or via KVKs, ICAR Institutes, SAUs, TSP projects, SHGs, NGOs, BLDO, Govt of West Bengal *etc*. the centre has generated a total revenue of Rs. 17.92 lakhs during this period.

Table 5. Hatching performance of *Vanaraja* parents

Age (wks)	Fertility (%)	Hatchability (%)		Weight of day-old chicks (g)
		TES	FES	
28	86.28	73.14	84.64	31.28
36	90.87	80.18	88.20	33.95
40	91.16	81.52	88.32	34.87
52	90.32	75.74	83.66	36.56
64	90.69	77.08	84.56	36.98
72	87.84	76.43	87.00	37.70

Table 6. Month wise distribution of germplasm supply and revenue generation

Month	Germplasm supply (No.)	Revenue generation (Rs.)
April 2018	7,998	39,120
May 2018	8,399	1,46,020
June 2018	6,752	1,76,770
July 2018	8,337	90,600
August 2018	9,746	1,22,800
September 2018	6,890	1,03,900
October 2018	8,545	1,88,500
November 2018	7,409	55,960
December 2018	5,957	4,98,960
January 2019	7,843	99,800
February 2019	6,858	1,02,500
March 2019	8,114	1,67,222
Total	**92,848**	**17,92,152**

Field performance and Feedback from the beneficiaries

Since last nine years of propagation of *Vanaraja* birds in the state, it is observed that around 26 percent of the total chicks produced from this centre were directly received by the beneficiaries. Rest 74 percent were channelized through various support systems. Organizations with routine and regular rural support systems, viz., NGOs, SHGs and KVKs handled approximately 57 percent of the total chick produced. It is also noted that beneficiaries receiving chicks directly are all progressive poultry keepers, aware of tit-bits of poultry farming and rear *Vanaraja* along with other breeds/ strains of birds. They consider rearing *Vanaraja* as a means of diversification of their poultry farming business. It is needless to highlight that small scale and backyard farming are now facing challenge from industrial system of production. Propagation of marketing channel of industrial production systems deep in to the rural areas is one of the discouraging factors to the propagation of small scale/ backyard poultry farming. Difficulty in adopting classical biosecurity measures is yet another problem faced by the backyard farming. Foreseeing uncertainty, prospective *Vanaraja* keepers are scare about making cash investment and look for some support system to lessen the impact of uncertainty. Neither *Vanaraja* chicken nor egg is able to fetch sale price nearer to that of the products from indigenous birds. Great variation has been recorded in sale price of marketable bird which ranges from Rs. 130/- to Rs. 150/- per kg live weight. In case of indigenous birds rate varies from Rs. 250/- to Rs. 300/- per kg live weight depending upon season and festivity. Backyard keepers find other advantages in rearing indigenous or local breeds/ strains.

Vanaraja females kept in free range with supplementation of wheat bran/rice bran were found to start laying at around 6 months of age, which is consistent for a long period, laying @ 16 eggs/day from a flock of 21 females and 3 males. There is a demand of *Vanaraja* eggs among the local farmers, using the same for table purpose as well as hatching purpose. The eggs were sold locally in premium price @ Rs. 13.00 per pair. Eggs from indigenous birds are sold @ Rs. 10/- per pair even being much smaller in size. Large numbers of *Vanaraja* birds are reared under deep litter intensive system for about 8-10 weeks for meat purpose. The average body weight at this stage was recorded to be 1.5-1.7 kg, the males being higher to some extent than their female counterparts. However, many farmers kept their birds under semi-intensive as well as backyard rearing system. The backyard poultry rearers intimated that the *Vanaraja* birds were frequently attacked by predator animals like dogs more frequently in comparison to those in case of indigenous birds, as they (*Vanaraja*) could not move fast like non-descript birds. According to the intensive rearers major negative feature of the *Vanaraja* birds being multicolored is their high shank diameter which deters the prospective consumer who look for birds with thin shank.

Farmers benefitted

Approximately 900 (nine hundred) farmers have been benefitted either directly from the project or via intermediate institutions and organizations.

Entrepreneurship development

Rearing of *Vanaraja* day-old chicks: Two entrepreneurs are doing business by rearing day-old *Vanaraja* chicks up to four weeks of age and sell them to terminal beneficiaries.

Constraints

No constraints were reported in operating the project.

Bihar Animal Sciences University, Patna

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grown up chicks of rural chicken varieties.
- Recording the growth, production, fertility and hatchability in parents.
- Collection of data on growth and production parameters from farmer's fields.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

Two batches (135 male and 1759 female) of *Vanaraja* parents were reared under deep litter at Patna Centre. All the batches are in laying stage at different periods of production cycle. The average chick mortality was below 5% across all the batches.

Body weight of parent stock was recorded at bi weekly intervals. The body weights at different weeks are presented in Table 7. The body weight is higher in male line and lower in female line parents compared to the standard body weight of the parents at 20 weeks of age.

Table 7. Body weight, g in *Vanaraja* male and female parents

Age (wks)	Male line	Female line
4	370.12±9.95	365.70±8.31
6	589.18±12.82	722.48±12.06
12	1892±46.44	1162±22.77
16	2350±59.97	1676±36.54
20	3114±62.90	1770±40.26

Egg production

The average age at sexual maturity was 180 days in *Vanaraja* female parents. The birds attained 10% production at 190 days of age. A total of 108643 eggs were produced. Monthly egg production percent was found to be ranged from 29.66 to 87.46.The average estimates of egg weight recorded at 24 and 36 weeks were 44.86±0.25 and 50.88±0.32 g respectively.

Table 8. Egg production and egg weight in *Vanaraja* parents (% on hen day basis)

Age (wks)	HDEP (%)	Egg weight (g)
28	20.27	48.64
36	51.35	50.88

Fertility and Hatchability

The average fertility was 78.27 % in *Vanaraja* parents. The average hatchability on TES and FES were 68.37 % and 72.54 %, respectively in *Vanaraja* female line.

Germplasm supply

A total of 69179 *Vanaraja* chicken germplasm was distributed to the farmers in Bihar during the period under report (Table 9).Out of total chicks distributed 54,011 were the day-old chicks of *Vanaraja* received by the progressive farmers and rest was the grown up chicks. An amount of Rs. 12.30 lakhs revenue was generated.

Table 9. Germplasm and revenue generation at Patna

Month	Germplasm	Revenue (Rs.)
April 2018	14,905	2,47,040
May	8,991	1,40,612
June	4,600	71,292
July	7,598	1,18,442
August	3,288	71,595
September	2,958	65,601
October	2,979	68,228
November	2,808	56,428
December	1,079	17,819
January 2019	3,075	56,085
February	5,354	96,064
March	11,544	2,21,167
Total	**69,179**	**12,30,373**

Feedback from the beneficiaries

The farmers reared the *Vanaraja* and *Gramapriya* birds under both intensive, semi intensive and extensive system but it was mostly backyard free range system. Under intensive system they used to maintain the birds in the pens made up of bamboo and wire net. Mortality of chicks up to 3 months of age is a great concern as reported by the farmers. Fowl cholera and Respiratory disease complex are the major problems faced by these farmers.

Constraints and difficulties, if any:

- Mortality of chicks during their early age particularly during the winter season is a great problem.
- During the month of December and January, in general, farmers do not prefer to take chicks due to severe cold.
- The high cost of poultry feed.
- There should be some budgetary provision for training and awareness activities for sustainable adoption of farming practices.

Regional Centre of ICAR Research Complex, Jharnapani, Nagaland

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grown up chicks of rural chicken varieties.
- Recording the growth, production, fertility and hatchability in parents.
- Collection of data on growth and production parameters from farmer's fields.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

One batch each in *Vanaraja* and *Srinidhi* parents were reared at Jharnapani during the reporting period. A total of 2042 parents of *Vanaraja* and *Srinidhi* were in position at the end of the financial year. The body weights of *Vanaraja* and *Srinidhi* parents at different weeks are presented in Table 10.

Table 10. Body weights (g) in *Vanaraja* and *Srinidhi* parents lines

Age (wks)	*Vanaraja*		*Srinidhi*	
	Male line	Female line	Male line	Female line
4	387	294	389	177
6	581	401	984	315
12	1047	991	1779	779
16	2210	1176	2126	923
20	-	1607	2418	1606

Egg production

The HHEP in *Vanaraja* and *Srinidhi* parents at different weeks are presented in Table 11. The egg production was consistent in both *Vanaraja* and *Srinidhi* parents. In *Vanaraja* female line, the egg production maintained at later stages also with 37% production at 72 weeks of age. However, in *Srinidhi* the egg production was lower throughout the laying cycle.

Hatching performances

The overall fertility rate was 73.58% which varied from 67 to 78 % in *Vanaraja* and 81.9% in *Srinidhi* (Table 12). The hatchability on FES varied between 72 % in *Vanaraja* and 69 %, respectively in *Srinidhi* parents across different batches.

Table 11. Egg production (HHEP %) in parents of *Vanaraja* and *Srinidhi*

Age (wks)	*Vanaraja*	*Srinidhi*
28	9.01	**33.37**
36	53.02	28.59
40	52.09	26.76
52	48.57	44.3
64	44.27	32.95
72	37.26	-

Table 12. Hatching performance of *Vanaraja* and *Srinidhi* parents

Batch	*Vanaraja*			*Srinidhi*		
	Fertility (%)	Hatchability (%)		Fertility (%)	Hatchability (%)	
		TES	FES		TES	FES
I	74.53	51.5	67.97	81.90	57.16	69.66
II	78.64	55.54	70.15	-	-	-
III	67.57	47.94	72.20	-	-	-

Germplasm supply

A total of 83,508 improved chicken germplasm was distributed to the beneficiaries including farmers, KVKs, NGOs working in Nagaland and neighbouring states and different state/central sponsored program during the year 2018-19. A total of Rs. 33.33 lakhs revenue was generated under PSP at Jharnapani Centre. Under Tribal Sub Plan 320 beneficiaries were covered from different districts in Nagaland and altogether 15176 nos. of day old chicks and grown up chicks of *Vanaraja* and *Srinidhi* varieties were provided to the beneficiaries. The performance of *Vanaraja* birds under field condition was appraised from the demonstration unit established in previous year.

Feedback from farmers

The feedback from the farmers is encouraging and the farmers are getting good income from the backyard poultry. Poultry Seed Project has been successfully

meeting the demand of eggs and meat in the remote areas of the country and providing subsidiary source of income and empowering the women in Nagaland.

Constraints:

- Irregular power supply throughout the year affecting hatchery operation. Additional power generator 50 KVA is required immediately for smooth running of the project work.
- Urgent requirement of another setter, as there is only one setter which when malfunctions creates inconveniences.
- Requirement of incinerator for disposal of hatchery wastes.
- Higher rate of chick mortality during winter season.
- Non-availability of quality feed ingredients in the region.
- Non-availability of proper packaging materials for grown up chicks.

ICAR-National Organic Farming Research Institute, Gangtok, Sikkim

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grownup chicks of rural chicken varieties.
- Recording the growth, production, fertility and hatchability in parents.
- Collection of data on growth and production parameters from farmer's fields.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

Two batches of *Vanaraja* parents were reared at ICAR, NOFRI, Gangtok, Sikkim during the year 2018-19. The body weight of male and female parents of *Vanaraja* at 20 weeks of age is given in Table 13.

Table 13. Body weight (g) of *Vanaraja* birds up to 20 weeks of age

Age (wks)	Body weight (g)	
	Female line	Male line
4	278	398
6	578	604
12	1190	1260
16	1535	1687
20	1950	2245

Egg production

The average HDEP in *Vanaraja* was 51.74 (24-72 weeks) during the reporting period (Table 14). Peak production (72 %) was attained at 31-34 weeks of age. The egg production was consistent throughout the laying period in both the batches.

Table 14. Egg production in *Vanaraja* parents birds (%)

Age (wks)	I batch	II batch
28	48.34	45.27
36	63.75	62.97
40	66.51	70.42
52	52.33	59.77
64	44.72	44.88
72	32.65	
Average	51.74 (24-72 wks)	54.86 (24-67 wks)

Hatching performance

The average fertility and hatchability (TES) in *Vanaraja* female line were 87.53 and 78.83%, respectively. The fertility and hatchability is fairly good indicating ideal hatching conditions.

Germplasm supply

A total of 89495 improved chicken germplasm of *Vanaraja* was distributed to 3371 farmers (Table 15) covering 667 village habitats in Sikkim. An amount of Rs. 16.77 lakhs revenue was generated from the centre. The centre achieved the set targets

and effectively popularized the backyard poultry farming in tribal and rural areas of Sikkim. The centre effectively implemented TSP under which about 93.2% of germplasm was distributed to tribal farmers with inputs like low cost housing facility, small poultry equipments, feed, medicine, etc. The centre demonstrated the backyard poultry as a tool for nutritional and livelihood security.

Feedback

Backyard poultry demonstrated successfully in Sikkim. The farmers expressed their satisfaction about the performance of *Vanaraja*. Farmers are getting good additional income from sale of the eggs and meat.

Constraints

No constraints were reported in operating the project

Table 15. Details of chick distribution in Sikkim

Month	Germplasm	No of Beneficiaries	No. of Villages
April 2018	4066	135	49
May	5084	196	50
June	3987	158	33
July	3602	139	40
August	7655	293	52
September	12375	488	71
October	11305	368	61
November	9435	334	55
December	10175	406	78
January 2019	9473	376	59
February	7084	267	62
March	5254	205	57
Total	**89495**	**3371**	**667**

Regional Centre of ICAR Research Complex, Imphal, Manipur

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grownup chicks of rural chicken varieties.
- Recording the growth, production, fertility and hatchability in parents.
- Collection of data on growth and production parameters from farmer's fields.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

Three batches of parents (*Vanaraja, Gramapriya* and *Srinidhi*) were reared at Manipur Centre during the year, out of which two are in laying and one in growing stage. The body weight at 20 weeks of age in male and female parents was 3080 and 2124 g in *Vanaraja* and 3111 and 1805 g in *Srinidhi*, respectively (Table16). The *Gramapriya* parents are about 10 weeks of age.

Egg production

The average HHEP was 18.57 % (55-72 weeks) in *Vanaraja* and 32.7% (24-72 weeks) in *Srinidhi* during the reporting period (Table 17). The average HHEP in eleventh batch of *Srinidhi* was 42% (20-53 weeks) and peak production (67 %) was attained at 32 weeks of age.

Table 16.Body weight (g) in *Vanaraja* and *Srinidhi* parents

Age (wks)	*Vanaraja*		*Srinidhi*		*Gramapriya*	
	Male line	Female line	Male line	Female line	Male line	Female line
4	493.1±1.06	274.7±0.40	582.8±0.41	230.8±0.27	214.1±1.37	120.6±1.01
8	1397±2.61	960.2±0.32	1485±0.48	612.8±0.28	570.8±0.40	480.3±0.32
12	1662±0.80	1104±8.13	1864±0.59	850.0±0.64	-	-
16	2506±1.37	1506±2.16	2543±7.12	1398±0.65	-	-
20	3080±3.07	2124±2.41	3111±6.35	1805±2.91	-	-

Table 17. Hen housed egg production (%) in *Srinidhi* parents birds

Age (wks)	*Srinidhi* (10th batch)	*Srinidhi* (11th batch)
28	47.43	35.02
36	63.01	57.93
40	32.07	45.20
52	32.11	38.92
64	9.91	--
72	3.51	--
Average	32.38 (28-72 wks)	46.13 (24-52 wks)

Hatching performance

The average fertility was 80.65 and 86.06 % in *Vanaraja* and *Srinidhi* parents, respectively. The hatchability was 58.05 (TES) and 71.99 % (FES) in *Vanaraja* and 66.73 and 77.54 % in *Srinidhi* parents, respectively.

Germplasm supply

A total of 79425 improved chicken germplasm was distributed to the farmers in Manipur (Table 18). The centre has generated Rs. 22.41 lakhs of revenue during the year 2018-19.

Field performance and Feedback from the farmers

Data were collected from the farmers randomly and has been classified and analysed being a part of impact assessment to approximate the most appropriate figures in terms of performance. The performance of supplied birds in various parts of the Manipur district in terms of their body weight gain, feed efficiency and mortality pattern in field condition were recorded. Along with the birds, other requirements such as feed, medicine and low cost traditional housing system were also given to the beneficiaries. The main reason of mortality during initial phase in farmer's field was due to irregular or insufficient electricity supply which is required for brooding of chicks and disease like coccidiosis, respiratory infection and endoparasite infestation. A higher rate of disease incidence was also observed where the beneficiaries did not follow the timely health cover and maintained properly.

Table 18. Germplasm supply in Manipur

Sl.No	Beneficiaries (Farmers/ Household/Villages)	District/State	Total No. of Chicks distributed
1	Ringkhu village	Chandel	6500 Chicks
2	Japhou village	Chandel	5000 Chicks
3	Farmers (130)	Senapati	3350 Chicks
4	Farmers (140)	Senapati	4000 Chicks
5	Farmers (245)	Tamenglong	4100 Chicks
6	Farmers (150)	Chandel	4550 Chicks
7	Farmers (175)	Chandel	5400 Chicks
8	Farmers (90)	Imphal west	3200 Chicks
9	Farmers (110)	Imphal west	5500 Chicks
10	Farmers (310)	Imphal West	2200 Chicks
11	Vengnuam Village (Adopted Village Under PSP)	Churachandpur District, Manipur	3000 Chicks
12	Thomkholui Village (Adopted Village Under PSP)	Churachandpur District, Manipur	3400 Chicks
13	Household (20)	Senapati	2400 Chicks
14	Household (49)	Senapati	4900 Chicks
15	Household (31)	Churachandpur	4350 Chicks
16	Household (12)	Churacahndpur	3330 Chicks
17	Farmers (30)	Ukhrul	3260Chicks
18	Framers (45)	Ukhrul	4420Chicks
19	Farmers (40)	Chandel	3200Chicks
20	Farmers (55)	Tamenglong	3365Chicks
Total			**79,425 Chicks**

Table 19. Field performance

Parameters	*Vanaraja*		*Srinidhi*	
Age (wks)	Male Average Body Weight (g)	Female Average Body Weight (g)	Male Average Body Weight (g)	Female Average Body Weight (g)
4	386.5	362.5	382.7	306.5
8	890.4	712.2	986.4	581.1
12	1332	904.6	1403	941.5
16	2173	1725	2273	1477
20	2850	1928	2984	1637

Parameters	*Vanaraja*		*Srinidhi*	
	Male	Female	Male	Female
Egg weight (g)	-	58.3	-	56.8
Shank Length (cm)	9.2	7.3	8.6	6.7

Constraints

- Outbreak of Fowl cholera in poultry farm
- Due to electricity problem in the field condition, the farmers are facing problem in brooding which result in high mortality of chicks.
- Occurrence of flood and inundation of water in the poultry shed mostly shed no.2 during rainy season. As a reason of this disease outbreak and mortality rate of the bird is high.

Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Hosur

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grownup chicks of rural chicken varieties.
- Recording the growth, production, fertility and hatchability in parents.
- Collection of data on growth and production parameters from farmer's fields.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

Two batches (III and IV batch) of *Vanaraja* parents were reared at CPPM, Hosur during the reporting period. The third batch of *Vanaraja* was in layer phase between 42 and 85 weeks of age and the fourth batch of *Vanaraja* was in chick and grower stage between day-old and 22 weeks of age. Similarly, three batches (II, III and IV batch) of *Gramapriya* were reared at CPPM, Hosur during the reporting period. The II and III batches of *Gramapriya* were in layer phase between 75 and 97 weeks of age and between 23 and 75 weeks of age, respectively. The fourth batch of *Gramapriya* was in chick and grower stage between day-old and 22 weeks of age. The body weight of *Vanaraja* at 20 weeks of age in male and female line was 2344 g and 1972 g, respectively and the body weight of *Gramapriya* at 20 weeks of age in male and female line was 2910 g and 1268 g, respectively (Table 20). The body weight at 20 weeks of age was similar to the target weight in the parent birds except *Gramapriya* male line, in which it was higher than the target weight. Age at sexual maturity was 143 days both in *Vanaraja* and *Gramapriya*. A total of 465 and 1053 parents of *Vanaraja* and *Gramapriya* were in position, respectively at the end of reporting period.

Egg production

The hen day and hen housed egg production in *Vanaraja* and *Gramapriya* are presented in Table 21.The hen day egg production ranged from 69 to 52% during 42 – 72 weeks of age with hen housed egg production of 175 at 72 weeks of age in *Vanaraja* (III batch). Similarly, the hen day egg production ranged from 86 to 64% during 23 – 72 weeks of age with hen housed egg production of 191 at 72 weeks of age in *Gramapriya* (III batch).

Table 20. Body weight (g) in *Vanaraja* and *Gramapriya* parents

Age (wks)	*Vanaraja*		*Gramapriya*	
	Male	Female	Male	Female
Day-old	44.79	42.07	39.86	35.68
4	432.7	354.5	333.6	150.1
16	1962	1532	2203	1064
20	2344	1972	2910	1268

Table 21. Egg production in *Vanaraja* and *Gramapriya* parents

Age (wks)	*Vanaraja* (III batch)			*Gramapriya* (III batch)			*Gramapriya* (II batch)
	HDEP (%)	HHEP (No.)	Egg weight (g)	HDEP (%)	HHEP (No.)	Egg weight (g)	HDEP (%)
28	-	-	-	79.2	24	48.2	-
34	-	-	-	77.2	53	52.6	-
40	-	-	-	58.0	79	54.0	-
46	68.2	85	55.2	64.0	97	54.9	-
52	63.2	107	55.5	62.0	118	55.9	-
58	55.8	126	55.8	68.8	139	57.8	-
64	54.2	142	56.5	67.2	161	58.3	-
72	52.2	175	57.0	63.6	191	58.7	-
78	45.7	-	-	-	-	-	65.9
82	-	-	-	-	-	-	53.5
92	-	-	-	-	-	-	46.1

Hatching performance

The fertility and hatchability of *Vanaraja* and *Gramapriya* parents are presented in Table 22. The fertility varied from 91 to 84% and hatchability (TES) ranged from 75 to 80 % in *Vanaraja* (III batch) parent. Similarly, the fertility varied from 86 to 90 % and hatchability (TES) ranged from 80 to 84% in *Gramapriya* (III batch) parents.

Germplasm supply

A total of 1,42,674 improved rural chicken germplasm of *Vanaraja* and *Gramapriya* were distributed to 1248 beneficiaries including farmers and entrepreneurs throughout Tamil Nadu. The Centre has generated total revenue of Rs. 36.03 lakhs during the year 2018-19. Month wise distribution of germplasm and the revenue generation is presented in Table 23.

Feedback from farmers

A feedback analysis was conducted with a series of field visit from farmers who have been rearing *Vanaraja* birds under ICAR-Poultry Seed Project. The average flock size of *Vanaraja* birds was 35-50. All the farmer beneficiaries have been rearing the birds under semi-intensive system by free-range grazing along with supplementary concentrate feed 55g/day/bird. Mortality rate were recorded as 8-10% upto 2 weeks and 0.5-1.0% for 2-8 weeks. Similarly mean body weight at 4th week and 8th week were 650 ± 0.27g and 1.72 ± 0.15kg respectively. The selling price in *Vanaraja* live bird (8-9 weeks) in the market ranged from Rs.200-250/bird. Expenditure incurred by the farmer towards supplementary feed, medicine etc. was Rs. 120 per bird and net income was Rs. 200-220 per bird.

Similarly, another feedback analysis was conducted among farmers who have been rearing *Gramapriya* birds under ICAR-Poultry Seed Project. The average flock size of *Gramapriya* birds was 25-30. All the farmer beneficiaries have been rearing the birds under backyard system by free-range grazing along with supplementary concentrate feed 55g/day/bird. Mortality rate were recorded as 10-12% up to 2 weeks and 0.5-1.0% for 2-8 weeks. Similarly mean body weight at 4th week and 8th week were 615 ± 0.12g and 1220 ± 0.35 g respectively. Body weight at sexual maturity was recorded as 1650 ± 0.35 g and age at first laying was 24±1 weeks. Mean egg weight was 55 ± 2.03 g and the maximum production recorded up to 235 eggs per year. The selling price of eggs observed at the market ranged from Rs.10-15/egg. Expenditure incurred by the farmer towards supplementary feed, medicine etc. was Rs. 50 per batch/ day and net income was Rs. 110-120 per batch/ day.

Table 22. Hatching performance in *Vanaraja* and *Gramapriya* parents

Age (wks)	*Vanaraja* (III batch)			*Gramapriya* (III batch)		
	Fertility (%)	Hatchability (%)		Fertility (%)	Hatchability (%)	
		TES	FES		TES	FES
28	-	-	-	90.0	73.7	88.5
32	-	-	-	90.7	83.1	91.6
42	90.6	74.2	82.0	82.3	70.1	85.2
52	90.5	79.4	87.7	90.1	84.5	89.5
62	88.6	75.6	85.4	86.6	80.4	88.9
72	83.6	77.3	88.2	86.2	80.1	87.3

Table 23.Month wise distribution of the germplasm and revenue generation

Month	Germplasm supply (Nos.)*			Revenue (Rs.)
	Vanaraja	*Grama priya*	Total	
April 2018	10,306	6947	17,253	3,07,478
May 2018	9,178	8365	17,543	2,39,450
June 2018	6,640	9203	15,843	5,45,804
July 2018	7,630	7859	15,489	3,07,239
August 2018	8,500	5965	14,465	4,33,019
September 2018	4,431	5033	9,464	2,35,863
October 2018	4,653	7769	12,422	73,034
November 2018	3,945	3727	7,672	3,86,682
December 2018	6,088	7264	13,352	2,94,995
January 2019	3,451	4925	8,376	1,83,463
February 2019	1,653	6364	8,017	3,35,244
March 2019	0	2778	2,778	2,60,577
Total	**66,475**	**76,199**	**1,42,674**	**36,02,848**

*Including hatching eggs

Constraints

Budget under Livestock was increased which in turn increased the Recurring Expenditure on feed, medicine etc. However, budget under Recurring Expenditure was not increased and allotted budget was insufficient to meet the recurring expenditure during 2018-19. Hence, budget allotment under Recurring Expenditure may kindly be increased.

ICAR-Central Coastal Agricultural Research Institute (CCARI), Goa

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grown up chicks of rural chicken varieties.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

One batch of *Srinidhi* parents was reared during the reporting period. The body weight of female and male parent of *Srinindhi* was 1270.50 and 3042.00 g, respectively.

Table 24. Body weight (g) in *Srinidhi* parents

Age (wks)	Male	Female
4	458.7	170.8
8	1296	439.5
12	1803	802.6
16	2975	1195
20	3042	1270
24	3300	1420
28	3510	1700
32	3734	1940

Germplasm supply

A total 1357 improved chicken germplasm was distributed to 42 farmers in Goa with a revenue of Rs. 2,27,708.

ICAR-Central Island Agricultural Research Institute (CIARI), Port Blair

Activity assigned

- Construction of civil works
- Maintenance of parent stock for continuous supply of fertile eggs, day old and grown up chicks of rural chicken varieties.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

Two batches of *Vanaraja* parents were reared under deep litter system during the period. The growing period body weights are presented in Table 25. A total of 627 numbers of *Vanaraja* chicks including 565 female and 62 male were procured. During the year 2018-19, a total of 360 female and 36 male *Vanaraja* breeders (Parent stock) attained breeding stage. A total of 24946 numbers of hatchable eggs were produced during the period from 24 to 52 weeks of age. The age at sexual maturity (ASM) was 178 days with average egg weight of 35.16±11.8 g and the egg weight of 55 g was reached at 35 weeks of age. The age at 5% egg production was 187 days. During breeding period, average feed allowance was 145 g per bird per day.

Table 25. Body weight (g) in *Vanaraja* parents

Age (wks)	*Vanaraja*	
	Male line	Female line
4	306.7 ± 3.36	165.8 ±2.17
8	883.0± 28.98	626.6±23.28
12	1198± 38.48	840.8 ±33.28
16	3398± 25.56	1550± 38.48
20	3414± 55.56	1826± 44.66

Egg production

Production performance of *Vanaraja* breeders were assessed on the basis of hen-day egg production (HDEP) and hatchability percentage. HDEP was found highest (37.87%) in 40th week of age. Hatchability percent was maximum in 36th week and lowest in 24th week (Table 26).

Table 26. Production and reproduction performance of *Vanaraja* breeders (Fourth batch)

Age (wks)	HDEP (%)	Hatchability (%)
24	1.46	32.22
28	13.71	33.42
32	26.54	35.31
36	31.22	53.63
40	37.87	43.12
44	30.18	45.12
52	27.74	46.23

Growing performance of *Vanaraja* breeders (Fifth batch)

A total of 627 numbers of *Vanaraja* chicks including 565 female and 62 male were brought from DPR, Hyderabad. The standard managerial practices were followed for the parent stock. The shed was cleaned, washed, flame gunned and fumigated with formaldehyde solution prior to the arrival of chicks and commencement of the experiment. The cemented brooding area was covered with paddy husk and standard brooding arrangement was made. All the chicks were provided with uniform brooding facilities using 60 W incandescent bulbs. The floor space of 675 cm^2 was provided. Growth performance of *Vanaraja* breeders have been mentioned in Table 27.

Germplasm Supply

A total 21,009 improved chick germplasm and hatching eggs were distributed to 246 farmers in Andaman & Nicobar Islands with revenue generation of Rs. 97250 during the year.

Success story at field level

A total of five farmers have successfully adopted poultry farming with *Vanaraja* birds. Flock size ranged from 30 to 150 birds per batch. Average body weight at marketing was 2.0 to 3.0 kg with a cost benefit ratio of 2.5.

Table 27. Growth performance of *Vanaraja* breeders (Fifth batch)

Age (wks)	Body Weight (g)	
	Male	Female
0 day	35.6 ± 1.37	34.9 ± 1.34
4	447.0±10.53	384.0±11.05
16	1822±81.13	1293±46.47
20	2951±147.9	2191±63.39

ICAR Research Complex for NEH Region, Umiam, Meghalaya

Activity assigned

a. Maintenance of parent stock for continuous supply of fertile eggs, chicks of improved chicken varieties (*Vanaraja* and *Srinidhi*)

b. Recording the performance of parents in the institute farm

c. Collection of data on performance from farmers' field and reporting their feedbacks

Work done

Parent stock

Two batches of *Vanaraja* and *Srinidhi* parent stock were maintained under deep litter system of rearing in the institute farm for production and supply of improved varieties of chicks.

Egg production

The different performance traits of *Vanaraja* and *Srinidhi* parents stock were recorded and given in Table 28.

Table 28. Average egg production and egg weight of *Vanaraja* and *Srinidhi* parents in the institute farm

Age (wks)	Hen day egg production (%)		Egg weight (g)	
	Vanaraja	*Srinidhi*	*Vanaraja*	*Srinidhi*
40	65.14	52.75	56.85	59.42
44	62.80	52.66	57.11	59.75
48	39.00	33.28	57.56	59.78
52	33.53	27.14	57.78	59.15
56	24.45	24.14	57.19	59.20
60	38.25	28.11	57.55	59.50
64	44.03	29.18	57.20	60.10
68	28.36	24.06	57.95	59.50
72	28.37	23.05	59.45	60.50
76	33.33	15.58	59.40	59.76
80	38.90	24.26	59.49	59.95
84	36.60	19.43	59.65	60.60
Overall	**39.40**	**29.47**	**58.10**	**59.77**

The fertility and hatchability (TES) ranged from 79-87% and 61-75%, respectively in *Vanaraja* parents, while the values were 79-83% and 56-62 % in *Srinidhi* parents, respectively.

Germplasm supply

Total of 30206 numbers of chicks were hatched, out of which 23000 numbers of chicks were supplied to the farmers and generated Rs.11,61,461/- as revenue by sale of chicks, eggs, chicken etc. during the period. The details of the germplasm production and supply during the period are given in the Table 29.

Table 29. Monthly germplasm production and supply

Months	Chicks Production (Nos.)	Chicks Supplied (Nos.)
April,2018	5643	5150
May,2018	6318	5395
June,2018	3872	2885
July,2018	1571	1161
August,2018	2137	1950
September,2018	2995	1365
October,2018	2585	2225
November,2018	1631	1631
December,2018	1334	225
January,2019	1145	310
February,2019	0	0
March,2019	975	703
Total	**30206**	**23000**

Feedback from the field

Attempts have been made to improve the income of tribal farmers in Meghalaya by scientific intervention in rural poultry farming under the ST component of Poultry Seed Project of the institute. Under this programme, 50 tribal farmers of different villages of Ri-Bhoi district were selected and imparted training on scientific rural poultry farming. On completion of training, 25 farmers were provided 20 numbers of one month old *Vanaraja* chicks to each and rest 25 farmers were provided 20 numbers of one month old *Srinidhi* chicks to each. The chicks were reared under backyard system. The periodical vaccination of birds and technical guidance were given. The comparative performance of *Vanaraja* and *Srinidhi* birds in terms of mean body weight at various ages, mortality, age at first egg, egg weight and average monthly egg production per bird up to 40 weeks of age were recorded and finally overall income from sale of eggs and live birds were calculated. There was no significant ($p<0.05$) difference in mean body weight of *Vanaraja* (1835.36 ± 76.49) and *Srinidhi* (1953.48 ± 67.50) birds at the age of first egg but at 40 weeks of age, the body weight of *Srinidhi* (2667.65 ± 114.40) birds was higher compared to *Vanaraja* (2311.11 ± 198.74) birds. The average age at first egg was recorded to be earlier in *Srinidhi* compared to *Vanaraja* birds. The overall mortality up to 40 weeks of age was recorded to be higher in *Srinidhi* (12.66 %) than *Vanaraja* (9.44 %) birds. There was no significant difference in egg weight between two varieties, however average monthly egg production per bird was higher in *Srinidhi* (12.63 ± 1.76) than *Vanaraja* (9.35 ±2.20) birds up to 40 weeks. The study revealed that overall the income from both *Vanaraja* and *Srinidhi* birds were found to be similar and equally accepted by the farmers in Meghalaya. The implementation of the Poultry Seed Project also created a significant impact in improving the livelihood of poultry farmers in Meghalaya by improving their income.

Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, (SKUAST), Srinagar

Activity assigned

- Maintenance of parent stock for continuous supply of fertile eggs, day old and grown up chicks of rural chicken varieties.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

The parent stock received on 22-07-2018 was reared up to 20 weeks of age. The birds were liquidated due to RD outbreak.

Egg production

The age at first egg ranged between 179 days in *Vanaraja*. The average egg production reached 59 (39-42 wks) and maintained above 40 % till 60 weeks of age. However, the production drastically reduced beyond 60 weeks of age.

Table 30. Growth performance in *Vanaraja*

Age (wks)	*Vanaraja*	
	Male line	Female line
4	403.2±5.20	260.4±6.24
6	686.4±15.54	470.3±8.46
12	1281±40.83	853.3±17.14
16	1993±62.31	1504±32.21
20	2123±138.34	1621±109.33

Hatchability

Average hatchability of 60% was recorded with peak hatchability of 80% at different ages from 40-60 weeks of age.

Germplasm

A total of 37630 *Vanaraja* chicks were distributed to farmers of Jammu and Kashmir during the year.

Sri Venkateswara University, Tirupati

Activity Assigned

- Construction of Civil works
- Procurement of equipment
- Rearing of parents in existing facility

Work done

During the year 2018-19, a total of 500 parents *Vanaraja* chicks were procured from the Directorate of Poultry Research, Hyderabad are being maintained for fertile egg production.

Germplasm supply

Total of 8763 numbers of chicks were supplied to the farmers and generated Rs.3,23,161/- as revenue by sale of chicks and eggs during the period. The details of the germplasm production and supply during the period are given in the Table 31.

Table 31. Germplasm supply and income generation

S.No	Particulars	2018-19
1	No. of chicks distributed	8763
2	No. of fertile eggs supplied to the farmers	26,720
3	No of farmers benefitted	152
	Income generation	
1	By sales of chicks	1,85,561/-
2	By sales of eggs	1,37,600/-
	Total income generated	**3,23.161 /-**

PVNR Telangana Veterinary University, Warangal

Activity Assigned

- Construction of Civil works
- Maintenance of parent stock for continuous supply of fertile eggs, day old and grown up chicks of *Vanaraja, Gramapriya and Srinidhi*.
- Recording the growth, production, fertility and hatchability in parents.
- Collection of data on growth and production parameters from farmer's fields.
- Analysis, documentation & reporting of the data.

Work done

Parent stock

Two batches of *Vanaraja* and *Gramapriya* parents were reared at Mamnoor Centre during the reporting period of which one is in laying and another in growing stage. About 462 *Vanaraja* parent stock and 638 *Gramapriya* parent stock were reared under the deep litter system. The growing period body weights of both the stock are presented in Table 32. The body weight at 20 weeks of age in male and female parents was 2100 ± 70.0 and 2014 ± 80.0 g, respectively in *Vanaraja* and *Gramapriya* parents. The body weight at 20 weeks of age in *Vanaraja* was almost similar to the target body weight in female lines. The mortality rates at stages (chick, grower and layer) were within the standard limits.

Table 32. Body weight (kg) in *Vanaraja* and *Gramapriya* parents

Age (wks)	*Vanaraja*		*Gramapriya*	
	Male	Female	Male	Female
4	0.412 ± 0.004	0.396 ± 0.002	0.431 ± 0.006	0.217 ± 0.002
6	0.762 ± 0.001	0.696 ± 0.001	-	-
12	1.271 ± 0.02	1.183 ± 0.01	-	-
16	1.708 ± 0.03	1.456 ± 0.02	-	-
20	2.100 ± 0.02	1.924 ± 0.02	-	-
40	2.537 ± 0.07	2.014 ± 0.08	-	-

Egg production

The age at sexual maturity (ASM) was 142 days (20th wk) in *Vanaraja* female line. The highest egg production (67.38%) was recorded at 46th week of age in the entire laying cycle. The average HDEP was 41.50 (28-52 weeks) and the egg production ranged between 34.43% and 67.38% from 28 to 51 weeks of age in *Vanaraja* parents. The egg weight at 40 weeks was recorded at 51.2 g in *Vanaraja*.

Table 33. Egg production (HDEP%) in *Vanaraja* parents

Age (wks)	*Vanaraja*	
	HDEP (Nos.)	Egg weight (g)
28	34.43	45.28
36	44.06	48.32
40	46.70	51.18
52	41.25	52.20

Hatching performance

The average fertility was 83.67 % (24-51 wks) in *Vanaraja* parents. The hatchability for TES and FES in *Vanaraja* is presented in Table 34.

Table 34. Hatching performance in *Vanaraja* parents

Age (wks)	*Vanaraja*		
	Fertility (%)	Hatchability (%)	
		TES	FES
28	85.15	58.75	68.99
36	80.73	49.36	61.14
40	82.72	59.68	72.14
52	82.95	38.67	46.62
Average	82.89	51.61	62.22

Germplasm supply

A total of 10,223 improved rural chicken (*Vanaraja*) germplasm was distributed to the farmers. The centre has generated total revenue of Rs. 1.81 lakhs during the year (Table 35). The centre is working hard in achieving the targets and for effective dissemination of the technologies to end users, this centre has published pamphlets and leaflets on scientific management of *Vanaraja* under rural conditions.

Table 35. Month wise distribution of the germplasm and revenue generation

Month	Germplasm supply (Nos.)	Revenue generation (Rs.)
October, 2018	966	32,553
November, 2018	1963	29,837
December, 2018	1767	19,022
January, 2019	1236	20,558
February, 2019	2479	64,531
March, 2019	1812	14,946
Total	10,223	1,81,447

Feedback from farmers

A good demand for *Vanaraja* and *Gramapriya* germplasm was observed in Warangal, Hyderabad and surrounding districts of Telangana state.

Constraints:

- Lack of hatchery at the farm site made it complicated, due to which there was a decrease in hatchability percentage in spite of good fertility rate.

Critical Observation On Performance of Different Centres

WBUAFS, Kolkata

Accomplishments and achievements

a. Eight cycles of *Vanaraja* parents were reared
b. Distributed 92848 chicks of *Vanaraja* to farmers
c. Generated an amount of Rs 17.92 lakhs revenue
d. Demonstrated two success stories of *Vanaraja* farming
e. Initiated small scale entrepreneurship with two progressive farmers

Shortfall

Nil

Suggestion for further improvement

Nil

BAU, Patna

Accomplishments and achievements

a. Two batches of parents were reared
b. Supplied 69179 chicks of *Vanaraja* to farmers
c. Generated Rs. 12.03 lakhs of revenue
d. Achieved the target of germplasm supply

Short fall

a. Data from field was not collected

Suggestion for further improvement

a. Data from the farmers' fields need to be collected

RC of ICAR Research Complex, Jharnapani

Accomplishments and achievements

a. Two batches of parents one each *Vanaraja* and *Srinidhi* rearing was in progress
b. A total of 83508 improved chicken germplasm was distributed to the farmers
c. An amount of Rs. 33.33 lakhs revenue was generated
d. Centre has achieved the germplasm supply target

Shortfall

Nil

Suggestion for further improvement

Nil

ICAR-NOFRI, Gangtok

Accomplishments and achievements

a. Two batches of *Vanaraja* parents were in position
b. Distributed 89495 chicks to the farmers in the rural and tribal areas of Sikkim
c. An amount of Rs. 16.77 lakhs of revenue was generated
d. The target supply was achieved

Short fall

a. Field data not provided

Suggestion for further improvement

Nil

RC of ICAR Research Complex, Imphal

Accomplishments and achievements

a. Three batches of *Vanaraja* and *Srinidhi* parents were reared
b. The centre has supplied 79425 chicks to farmers
c. An amount of Rs. 22.40 lakhs of revenue was generated
d. Field data collected
e. The target supply was achieved.

Short falls

Nil

Suggestion for further improvement

a. Strict biosecurity measures needs to be adopted at the centre to prevent the diseases

TANUVAS, Hosur

Accomplishments and achievements

a. Four batches of parents were in position
b. Distributed 142674 chicks of *Vanaraja* and *Gramapriya* to the farmers in Tamil Nadu.
c. Generated an amount of Rs. 36.03 lakhs revenue
d. Field data collected
e. The centre has achieved the target supply. The efforts of PI and team are commendable

Short fall

Nil

Suggestion for further improvement

Nil

ICAR-CCARI, Goa

Accomplishments and achievements

a. One batch of *Srinidhi* is in position

b. Distributed 1357 chicks to the farmers

Short fall

a. The performance is very poor

b. Target supply not achieved

Suggestion for further improvement

a. Parents should be reared in 3-4 cycles for continuous supply of chicks

b. Efforts should be made to meet the target supply

c. Parent rearing should be initiated in the new poultry house

ICAR-CIARI, Port Blair

Accomplishments and achievements

a. Two batches of parents are in position

b. Distributed 21009 improved germplasm to the farmers

c. Generated Rs. 0.97 lakhs revenue

Short fall

a. Target supply not achieved

b. Egg production is very low

c. Hatchability is very low

Suggestion for further improvement

a. Efforts should be made to achieve the target supply

b. Parents should be reared in 3-4 cycles for continuous supply of chicks

c. Lighting management needs to be monitored

d. Needs improvement in hatching conditions and hatchery management

SKUAST, Srinagar

Accomplishments and achievements

a. Two batches of parents were reared

b. Distributed 37630 chicks to the farmers

c. Generated Rs.8 lakhs revenue

Short fall

a. Germplasm supply needs to be increased

Suggestion for further improvement

a. Efforts should be made to achieve target supply

b. Provide dry environment especially during winter and rainy season

ICAR-RC for NEH Region Umiam, Meghalaya

Accomplishments and achievements

a. Construction of poultry house is in progress

b. Two batches of parents were reared

c. Distributed 30206 improved germplasm to the farmers

d. Generated Rs. 11.61 lakhs revenue

Short fall

Nil

Suggestion for further improvement

a. Efforts should be made to complete the civil works at the earliest

PVNRTVU, Warangal

Accomplishments and achievements

a. Construction of civil works is in progress

b. Two batches of *Vanaraja* were reared

c. Distributed 10223 *Vanaraja* chicks to farmers

d. Revenue was 1.81 lakhs

Short fall

a. Civil works not yet completed

Suggestion for further improvement

a. Efforts should be made to complete the civil works and procurement of equipment at the earliest

SVVU, Tirupati

Accomplishments and achievements

a. Construction of civil works in progress

b. Initiate parent rearing in existing facility with *Vanaraja*

c. Distributed 8763 chicks to farmers

d. Generated 3.23 lakhs revenue

Short fall

a. Civil works not yet completed

Suggestion for further improvement

a. Efforts should be made to complete the civil works and procurement of equipment at the earliest

Success Stories

AICRP on Poultry Breeding

Friendship extends a hand for livelihood-with support from AICRP on Poultry, Mannuthy centre

In 1987, Mr Manoharan who was just 25 years met with an accident in Ernakulam. He was in coma for three months and after regaining consciousness was paralysed for over a decade. This accident changed the life of the whole family. The only income for the family was the pension which Manoharans mother received every month.In February 2016, the pre-degree batch mates of 1977-1979 at Bharata Mata College (BMC), had a get-to-gather and Manoharan also attended the meeting with the help of some of his friends. This meeting changed his life. The batch mates who understood the pathetic situation of Manoharans family decided to start a small venture by which Manoharan would be able to earn on his own. Finally it was decided to start a poultry farm and the group of friends visited AICRP on poultry for eggs farm at Mannuthy and understood in detail all requirements to start a poultry unit. All technical support and guidance for this venture including providing healthy native chicks for the farm was given from AICRP on Poultry for Eggs, Mannuthy center. Based on this assurance and support from the center, the friends' team started developing a poutry farm for Manoharan-Valsala at Edapally.

The construction of three sheds each of 20 x 10 ft, two for poultry and another for a packing unit of organic fertilisers was started in February, 2018 . On April 25th the first lot of 225 chicks were brought. The cost of chicks, feeding trays and initial expenses was about Rs 7500. The birds started laying eggs in August 2018. The first sale of the cock @Rs 220 per kg and egg @ Rs 8 per egg was conducted during the inaugural function. Subsequently 90% (40 numbers of the cocks were sold. The money received from sale of the poultry (Rs 16000) was deposited in Mr. Manoharans account. Slowly the number of eggs per day increased and reached up 70 to 78 eggs per day till November 2018 with an average daily income of Rs 560 per day from the sale of eggs. Now since January 2019, the price per egg was increased to Rs 9 since the cost of feed also increased.

The main achievement was that the family which survived only on one person's pension started earning an income. The transformation of Mrs Valsala who was not earning to an entrepreneur with confidence is a success. Now she has the capability to manage a poultry unit**.** This venture is a success story of what can be done to help the less privileged through simple technologies. The support in the form of financial assistance and in the development of infrastructure has helped this family to start a life of their own.

Photographs

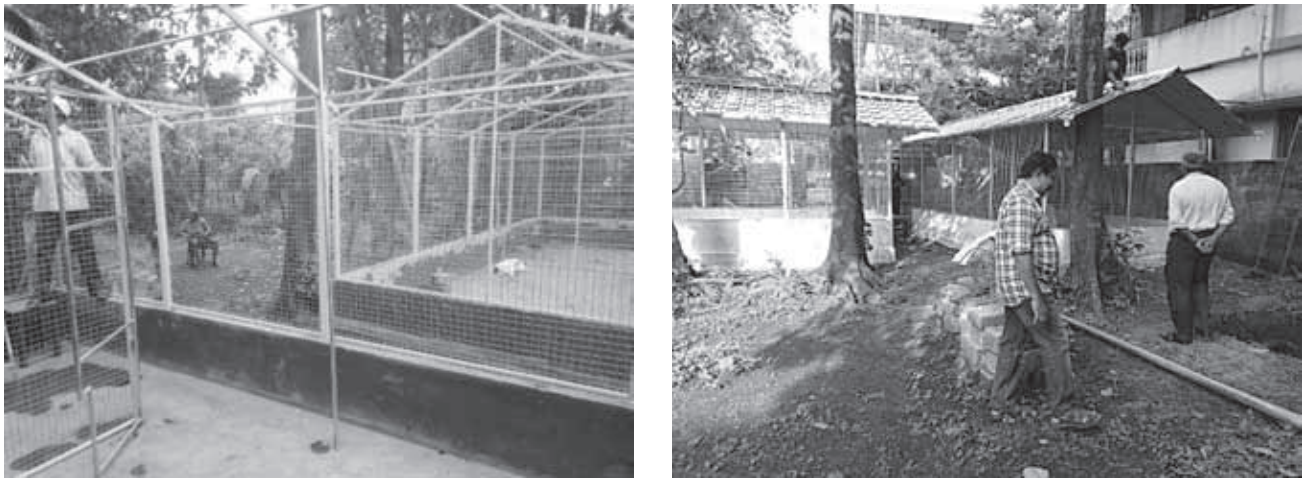


Fig 1 Construction of the Poultry farm at Edapally, in the plot of Mr Manoharan (Right-view of the completed poultry shed)


Fig 2. Purchase of one day old chicks from AICRP on Poultry for eggs, Mannuthy, KVASU (Right-one day old chicks)


Fig 3 Chicks being stocked in the Poultry shed of Mr Manoharan by the friends team on 25th April 2018 (Right-Full –fledged rearing unit with bottom covered by saw dust, light and feed-water trays)


Fig 4 Fully grown poultry in Manoharan-Valsalas Poultry unit in August 2018



Fig 5 The poultry farm product ready for sale and on right –first sale to the President of Residents Association

Self employment: - By Establishing Kadaknath Hatchery Unit (Jabalpur Centre)

Considering the enormous demand of *Kadaknath* chicks & fertile eggs in the tribal areas of M.P. State and from different places of various states, Shri Saurabh Gupta a graduate BE, (IT) qualified unemployed youth with the technical guidance, training and continuous consultancy services, and follow-up from the Scientist of our centres established a hatchery unit in the name of PIKU FARM at Village, Tendukheda, District - Damoh. Initially he kept 1000 *Kadaknath* parents 800 males + 200 females and subsequently after 6 – 7 months he also reared a separate unit of 800 parents of Kadakanth birds in village, Sukha nearby Jabalpur for making continuous supply of fertile eggs to hatchery for continuous production of chicks throughout the year. By the help of local fabricator and material he prepared an incubator set with capacity of 10500 eggs. He also made a small incubator (120 eggs) by converting small unused refrigerator. Parents were reared by providing full feed. He obtained more than 90 eggs per bird annually and started chick supply form the yr. 2017 – 18. On an average he sold about 36800 chicks @ Rs. 55- 60 (Doc) and @ Rs. 110 (21 day old) in different district of M.P. state and many places of Maharastra & Chhatisgarh state. In addition he sold approximately 170 culled bird @ Rs. 500 / bird during the year and also sold 4230 fertile eggs to local peoples. By selling of chicks / fertile eggs, culled birds he could able to earn Rs. 20,50,000 /- in one and half year (18 months) period. After deducting all the expenditure incurred as cost of chicks, feed, labour, electricity etc. he able to earned more than Rs. 70,000 per month by sale of *Kadaknath* chicks from his hatchery unit.

He is not only a self employed successful entrepreneur but also provided employment to 14 persons (labours) and further thinking to expand this business from profit of unit in view of huge demand for *Kadaknath* chicks from all parts of country.

Successful hatchery unit

Smt. Jyoti Thantharate a women farmers of village Suhagi, distt. Jabalpur who is running her hatchery unit successfully since last six years and supplying the colored chicks to NGO's, tribal farmers and mother units of MP state Govt. still continuing this business. She has extended the parent stock Strength upto 1200 in newly constructed double story (30^1x60^1) shed from profit of hatchery unit. Smt. Jyoti sold more than 1,50,000 chicks during the current year and earned more than Rs. 60,000 per month by sale of coloured chicks to farmers.

Success story of Smt. Lilmuni Hembrum and Sushila Hembrum of Dumka (Ranchi Centre)

Dumka is tribal dominated district surrounded with silly hills, undulated agricultural land with nearly 5-10% irrigation facility. So, the farmers of Dumka are mainly dependent on monsoon paddy, supported and engaged himself as daily wages labour with small stock of goats/poultry rearing. This success story is for Smt. Lilmuni Hembrum and Sushila hembrum of village Gidhni pahari. The village Gidhni Pahari is about 3 KM away from Dumka sadar. Although it is near to Dumka town but there is acute poverty due to illiteracy, topographically situated at hilly top and about 90-95% trible dominated population. A demonstration of 'Jharsim' poultry – a back yard dual purpose variety developed by BAU, Ranchi was performed by Animal Husbandry scientist of Krishi Vigyan Kendra Dumka in 10 farmers of Gidhni Pahri. Among them two lady farmers viz. Smt. Lilmuni Hembrum and Sushila Hembrum has got tremendous success through this variety. Before adoption of this variety they were rearing Local Desi bird, getting 60-70 eggs/annum from a hen and 750-800 gm live weight/year from cock. So previously from this local bird they were hardly getting Rs. 600-700 from each bird in year. But, after adoption this variety they are getting nearly150 eggs/year from a '*Jharsim*' bird and at the same time the average weight of cock was 1.230 kg in 5 months. So after adoption of this technology, they are getting just double the amount from previous one. Today, Smt. Lilmuni Hembrum and Sushila Hembrum are getting Rs.1500-2000 from each *Jharsim* bird. Beside selling of eggs and live bird, they are also getting nutritional enhanced diet in family by consuming eggs. These farm women not only getting handsom amount but also a part of extension member of our *Jharsim* poultry as Back yard poultry farming for Dumka district.





Women Empowerment Through Backyard Poultry Farming (Ranchi Centre)

Farmer name Sania Tuddu

Address: Burudih, Gamharia, Saraikela-Kharsawan, Jharkhand

Sania Tuddu is a college going rural youth girl native of village Burudih, block Gamharia,district Saraikela-Kharsawan, Jharkhand. She is associated with rural farm family having poor income. Livelihood of her family have depended on casual worker and farm labour worker. Thus, her family was suffered with heavily economic problems. However, she did her matriculation with lots of problematic situation. After that she was not able to continue further higher study for her bright future due to unfair condition of family. To support her family and took admission in college for higher education she was searched for employment in government and private sectors but she was failed. She started work as farm labour in paddy transplanting, harvesting and in field preparation. Thus, she started earn income for family and own spends but it was very few amount to fulfill the daily households as well as education expenditures. In the mean time she visited Kisan Mela organized by Krishi Vigyan Kendra, Saraikela-kharsawan in the year 2015 where she came across with exhibited technologies and acquainted with many suitable technologies according to my desire of work. Her family was traditional poultry keepers so she discussed more for improved backyard poultry farming with Dr. Pankaj Seth, scientist (Animal Science) KVK, Saraikela-Kharsawan in the Kisan Mela. He gave her general knowledge and skill needed for improved technique of backyard poultry farming for small scale farmers and she also registered her name for training on poultry farming. she took keen interest in backyard poultry came when she came to know about *Jharsim* a dual type variety of chicken developed by ICAR-AICRP on Poultry Breeding, BAU, Ranchi by ICAR- Directorate of Poultry Research,Hyderabad. She acquainted with different aspects of poultry farming regarding breeds, feeding, disease control, vaccination. Her interest was ignited when she come to know about *Jharsim* a dualn type variety of poultry from Ranchi Veterinary college, Birsa Agricultural University, Ranchi. She started poultry farming with 20 *Jharsim* poultry birds in the same year of 2015 with the supervision of krishi Vigyan Kendra KVK, Saraikela-Kharsawan as Front Line Demonstration (FLD) programme. Thus, she started backyard poultry farming activity on morning and evening leisured time after college and daily homestead work. After six months my poultry started producing eggs and also body weight of poultry have been increased. Her poultry produced average 132 eggs and gained in average body weight were 3.0 kg to 3.5 kg. she sold her poultry farm produced as Rs. 10 .00 per egg and Rs. 280 .00 per kg of poultry through this sale she was earned Rs. 12000.00 which helped in expansion of her poultry farm business and daily expenditures of family. With this experience she have stock a flock size of 135 *Jharsim* birds within two years. Thus, she earned average income of Rs. 30000.00 to Rs. 35000.00 per year by selling of *Jharsim* poultry and eggs. This handsome money helped her in college admission fees, tuition fees, college dresses, daily pocket money, fare of auto and she also helped in households expenditures. Further, she interested to say that she purchased a scooty bike by the sale of *Jharsim* poultry farming. She also formed a women group of 15 colleges – school going girls for backyard poultry breeders' with support of KVK scientists and youth brothers of her village. Many of other girls of adjoining villages and relatives came for know this practice and techniques of backyard *Jharsim* poultry farming.

Ranchi Doordarshan has recorded her success story as documentary film of her *Jharsim* poultry farming. She also gave Radio Talk on backyard poultry farming for women empowerment and livelihood security. She have been appreciated with award by Governor of Jharkhand in state level Agro-tech Kisan Mela 2017 organized by Birsa Agricultural University, Ranchi.

Now, many of women farmers of her village get inspired and confidence after meeting with Sania Tudu and seeing her poultry farm.

Receiving award from Hon'ble Governor Jharkhand for Backyard Poultry farming

"Kamrupa" rearing as a source of income in rural condition of Assam

Challenge

Due to quick return from poultry rearing in Assam majority of the people are engaged themselves in poultry rearing as more than 90 percent people of this region are non-vegetarian by food habit. But due to slow growth rate people showing less interest in case of indigenous bird rearing. Therefore people prefer to rear "Kamrupa" bird-a dual purpose rural variety of chicken to have better body weight than indigenous bird for meat purpose. This success story belongs to a farmer of Kamrup (Metro) district.

Initiative

Development of a superior variety of rural poultry is of paramount importance for the rural farmers of Assam. Although many a times attempt had been made but could not be materialized due to many reasons. Finally during the plan period of 2007-2012 the Indian council of Agricultural Research is kind enough to allot a centre to Assam Agricultural University at Guwahati, Assam. Preliminary survey throughout the State of Assam more than 6 months in 6 agro climatic zone of Assam revealed that more the 75 percent of people of the region desire to develop a dual purpose variety. Accordingly a technical programme had been prepared by the then Project Directorate on Poultry, Hyderabad incorporating the inheritance of Indigenous bird, a meat and a egg type parents. In concurrence to that a three way cross was developed in 2012-13. This three way cross had been tested in premises of 50 farmers in scavenging situation and in 6 KVK,s of Assam Agricultural University. The performance of this cross found to be very encouraging in terms of production and named as Kamrupa and released in February,2015 by the Honourable DDG(AS) in presence of Honourable Vice-Chancellor, AAU in presence of faculty members and farmers. The direct beneficiaries are the rural farmers to enhance their income. The AAU is benefitted in terms of all infrastructures along with the financial aid received from ICAR.

Key result/insight/interesting fact

Mr. Mukul Chandra Dutta is a poultry farmer of Sonapur (Patarkuchi) under Kamrup (Metro) district received 300 nos. of Kamrupa DOC, from here 226 birds survived till 5 months. He sold the birds at 5 months @ Rs. 300/kg. At this age the weight of the birds were average 1.6 Kg. He got an profit Rs. 73,480/- by selling the birds. Kamrupa birds can be successfully raised and can be a promising variety for meat production under rural situation. A paper on performance of "Kamrupa" is published and the reference is- Kamrupa-a new dual chicken variety for farmers of Asom and north-east-India, Indian journal of Animal Sciences, 86(6):686-690, June, 2016.

Impact

Mr. Mukul Chandra Dutta is a retired Government employ who have interest in case of poultry farming. He came to College of Veterinary Science, Assam Agricultural University, Khanapara to know about Kamrupa bird from TV programme/friends. After getting the required information from AICRP on Poultry Breeding he procured 300 birds from us. He earned a handsome money of Rs. 14,696/month and it gives him inspiration towards poultry farming.

Lessons Learned

It is learnt that knowledge, strong determination and hard working is the key of success in any sector. Though some outbreak of diseases are encountered but this can be overcomed by strong biosecurity measures.

Suppoting Quotes and Images

Mr. Mukul Chandra Dutta is a poultry farmer of Sonapur (Patarkuchi) under Kamrup (Metro) district.

Additional Information

The development of Kamrupa is a team work comprising the different person of different capacities of Assam Agricultural University including all the personnel of AICRP on Poultry Breeding of AAU, Guwahati centre.

Mr. Mukul Chandra Dutta is a poultry farmer of Sonapur (Patarkuchi) under Kamrup (Metro) district of Assam, Telephone number 88129-43308.

Livelihood promotion through "Kamrupa" rearing in rural condition of Assam

Challenge

Among the different district of Assam, Darrang district is one of the important district in terms of poultry rearing as the demand of poultry meat is very high in this area. Though some of the people of this area follow scientific managemental practices but majority of the people rear indigenous bird in mostly traditional method. Therefore the production of poultry meat in this area is very low. To enhance the livelihood of these rural farmers through poultry farming, chicks of a dual type crossbred variety (Kamrupa) which was developed in AICRP on Poultry Breeding, Directorate of Research (Vety.), AAU, Khanapara, were sold to the different farmers of different places of this area and performance and the economy of rearing Kamrupa were properly studied in backyard system of management. This success story is about a farmer whose name is Md Riajul Haque of village Niz Barampur under Darrang district of Assamese community.

Initiative

Development of a superior variety of rural poultry is of paramount importance for the rural farmers of Assam. Although many a times attempt had been made but could not be materialized due to many reasons. Finally during the plan period of 2007-2012 the Indian Council of Agricultural Research is kind enough to allot a centre to Assam Agricultural University at Guwahati, Assam. Preliminary survey throughout the State of Assam more than 6 months in 6 agro climatic zone of Assam revealed that more the 75 percent of people of the region desire to develop a dual purpose variety. Accordingly a technical programme had been prepared by the then Project Directorate on Poultry, Hyderabad incorporating the inheritance of Indigenous bird,a meat and a egg type parents. In concurrence to that a three way cross was developed in 2012-13 .This three way cross had been tested in premises of 50 farmers in scavenging situation and in 6 KVK,s of Assam Agricultural University. The performance of this cross found to be very encouraging in term of body weight and other growth related traits and named as "Kamrupa" which is released on 11th February, 2015 by the honourable DDG (AS) in presence of Honourable Vice-Chancellor, AAU in presence of faculty members and farmers. The direct beneficiaries are the rural farmers to enhance their income. The AAU is benefitted in terms of all infrastructures along with the financial aid received from ICAR.

Key result/insight/interesting fact Md Riajul Haque of village Niz Barampur under Darrang district received 143 nos. Chicks in every batch from which 130-135 nos. bird survived till their market age. He sold the bird at the age of 2 months where some of the bird he sold @ Rs. 270/bird and some of the bird sold @ Rs. 280/bird. The weight of the bird were at the range of 800-900 g. He got an average of profit Rs. 8,000/month and Rs.96,000/year.

The Kamrupa birds can be successfully raised and can be a promising variety for meat production under rural situation. A paper on performance of "Kamrupa "is published and the reference is –Kamrupa-a new dual chicken variety for farmers of Asom and north-east – India, Indian journal of Animal Sciences, 86(6):686-690, June, 2016.

Impact: Md Riajul Haque of village Niz Barampur under Darrang district who was also an unemployed and rear some indigenous bird but it is not at all economical as the productivity of indigenous is very low. He is coming to college of veterinary Science in search of a job. As an poultry consultant I have advice him to start a poultry farm with Kamrupa and also given a preliminary training about rearing of poultry. He picked up and started the farm with Kamrupa. Gradually he enhance his knowledge and skill in poultry rearing, inclined to take poultry farming as livelihood security .More than that the earned almost a handsome profit like a salary and this prevent his outflow mind to move from rural area to urban society in search of job.

Lessons Learned

It is learnt that with a good mindset, strong determination, aptitude for work and can very well help to progress in life. The main challenging at present is the outbreak of Bird flu. To overcome the challenges strong biosecurity is the only means.

Supporting Quotes and Images

Sr Md Riajul Haque of village Niz Barampur under Darrang district of Assam.

Additional information

The development of Kamrupa is a team work comprising the different person of different capacities of Assam Agricultural University including all the personnel of AICRP on Poultry Breeding of AAU, Guwahati Centre.

The story relate to Md Riajul Haque of village Niz Barampur under Darrang district, his phone number is 6000935891.

Ex-Military farmer embrace backyard poultry farming as remunerative enterprise in a famous tourist paragliding site, Bir-Billng in Himalayan Region

Challenge: Rural backyard poultry farming is an important allied activity in Agriculture having great potential under mixed farming system as practiced by majority of farmers in Himachal Pradesh. Back yard poultry farming is now gaining momentum in rural areas and is providing high quality animal protein at reasonable prices to the local population. However, contrary to rapid national growth, poultry production in HP had grown slowly due to sluggish growth of organized commercial poultry. The total poultry population in Himachal Pradesh is 11.04 lac birds (2012 census) having grown by 36.55% during 2007-12 period, most of this growth is contributed by backyard poultry farming. The per capita egg availability of 15 eggs per annum is far lesser than national per capita availability of almost 70 eggs/ annum. For promoting backyard poultry production in rural areas, dissemination of improved germplasm and establishment of backyard poultry units to targeted sections of population (women, farmers and unemployed educated youth) is needed. Lack of technical know how and suitable germplasm, decrease in availability of natural resources of feed and in adequate veterinary support are them a in constraints of traditional backyard poultry production systems in the state of Himachal Pradesh. Identification of skilled farmers who can take up rural backyard poultry activity with improved input and management is another area which needs concern to increase productivity and profitability of rural/ backyard poultry farming. Sh. Devinder Singh is a nex-army man belonging to Village Chauntrain District Kangra, Himachal Pradesh involved in multifarious agricultural activities including poultry farming as an integrated farm enterprise.

Initiative: After his retirement from army, Sh. Devinder Singh started commercial broiler farming at small scale. After rearing 3-4 lots (200-250 each) of broiler, he failed to realise desirable profit and almost abandoned poultry farming component. This could be due to high chick and feed costs involved in transportation and supply of broilers from adjoining state of Punjab at cheaper price. Later, after knowing about the location specific poultry variety "*Himsamridhi*" developed by AICRP on poultry breeding, (Rural unit) Palampur, he again became interested to start backyard poultry farming. However, contrary to other local farmers who are practicing rural poultry farming with upto 50 birds he wanted to upscale the activity and start a comparatively bigger unit. Sh Devinder was supplied 350 straight run chicks in early- April, 2018 to start his backyard poultry rearing venture and extended technical advice from time to time including preventive measures against major diseases. Visit to university poultry farm was also arranged for skill up gradation and capacity building. The growth of the chicks supplied were periodically monitored by on farm visit. During on farm visit, his concerns were also addressed and appropriate technical guidance/inputs were provided. The mortality in his flock was very less (less than 5%) during the chick and growing phases.

Key results/highlights/interesting facts: The birds started laying eggs in mid of September, 2018 at around 5 months of age. He is retaining the laying hens till date with few culling. The male birds/ cockerels which attained body weight of 1500-2000g at about 6-months of age were sold as per requirement from time to time @ Rs.400-500/per bird giving him income of Rs 50000/- in six-month duration from sale of cockerels. Since he is residing near to the world famous paragliding site of Bir-Billling, frequently visited by many trackers/para-gliders and adventure loving persons/tourists including foreign nationals. The visitors usually stays in the local home stays and according to Sh. Devinder Singh during the peak season he earned handsome returns by selling of cockerels at premium price since country chicken is in great demand among the foreign visitors.

The egg production of female birds was around 110 eggs per day from around 160 layers during the peak production in winter months. During this period, he was able to sell eggs @ Rs. 10-12 Rs per egg. At present, he is getting about 50-60 egg daily giving him income of Rs. 500-600 per day.

He adopted mixed system of scavenging with grains for rearing poultry birds keeping the input cost at bare minimum. He also practices supplementation with vitamins, minerals and calcium from time to time.

A portion of eggs produced and cockerels were also consumed in the family to improve their nutritional quality. Sh.Devinder Singh was so much fascinated by the gain he could made from rural poultry farming by paying attention to minute management skill and marketing strategies, he get enrolled himself for one month Skill development training in Small Poultry Farmer trade at CSKHPKV, Palampur. His basic objective was to gain practical hand son training on different aspects of poultry management to tackle many routine problems he faced while rearing his previous stock himself at farm level.

Impact: Sh. Devinder Singh who once started broiler farming after his retirement and sustain losses is now making handsome profit in backyard poultry farming with improved LIT birds of *Himsamridhi*. With his experience of poultry farming activities he up-scaled the back yard poultry activities to 400-500 birds under semi-intensive system coupled with utilization of local resources to maximise gains. His marketing strategies and utilization of potential tourist market nearby his residence helped him to realize hand some profits. His work also high lighted that back yard poultry farming activities can be up-scaled in peri-urban or near potential markets and is viable tool for livelihood and income generation. He is continuing with this occupation adding small replacement batches of 100-200 chicks at periodical intervals.

Housing and rearing system adopted

Eggs of *Himsamridhi* at farmer's flock

Poultry Seed Project

Passionate with a difference: A Tale of Poultry Power (Kolkata Centre)

Shri Bivash Kumar Paul, resident of Ashokenagar, North 24 Parganas district of West Bengal, is a successful dairyman. He is having around 42 crossbreed milch cows along with some quality heifers. Average milk production in his farm is 210 lt per day. He runs a sweet shop and uses total milk produce for making sweets and other milk products. "To know more about the dairy I decided to participate in training to enrich myself with some knowledge so I visited North 24 Parganas KVK. I saw the poultry shed in the KVK premises and I was very much interested seeing one of the poultry units. I discussed with the KVK expert and came to know about *Vanaraja* birds", says Shri Paul. He then decided to start rearing *Vanaraja* birds in the unutilized spaces surrounding his dairy farm. He started with only 50 birds. He kept the birds semi-intensively, maximum time of a day they were free to scavenge and in the evening they were kept in shed and were offered some concentrate feed. The birds attained body weight of 2-2.5 kg in 3 months of age. He sold them all and got very good feedback regarding the taste and flavor of the meat. Customers used to come to his farm to buy the birds. He got some profit from the birds along with his dairy. Then he decided to increase the area of the poultry farm so that he can accommodate more number of birds at a time. He decided to keep 800 - 1000 birds per batch. He took training from the KVK and ordered 1000 chicks there. He was always supported technically by KVK experts. This time he decreased the duration of scavenging and kept birds more time intensively. In around 2 and half months the birds attained average body weight of 2 kg. In the meantime he talked with some local meat shop owners. He sold out all the birds at a time. "I got profit of Rs.50.00 to Rs.60.00 per bird. I was so happy that I really added some profit with the profit from the dairy. I utilized my farm more efficiently", was the reaction of Mr. Paul. After that he keeps 1000 birds per batch and 3-4 batches a year. He has become an inspirational personality in his surroundings. People are regularly visiting his farm and some of them are starting rearing poultry. Along with *Vanaraja* recently he started rearing *Gramapriya* and Kadaknath in different sheds. He reduced feed cost by feeding birds homemade concentrate feed under the guidance of KVK expert and feeding considerable amount of greens cultivated in his own farm field. He engaged 8 persons to look after his entire farm. His annual turnover at present is around 13.50 lakh.

Name	Shri Bivash Paul
Address	510/1, Ashokenagar, P.O. + P.S.- Ashokenagar, North 24 Parganas, West Bengal, Pin - 743222
Qualification	B.Com
Age	51 years (24.11.1968)
Mobile No:	07407500133
Nature of Venture	Dairy Farming – 42 Crossbred dairy cows plus 3000 *Vanaraja* birds per year
Nature of services	Production and marketing of milk, making sweets and other milk products and selling of birds
Annual Turnover	13.50 lakhs
Farm size (ha)	1.60
No. of Employment	8 persons round the year
Documented by:	Dr. Kaushik Pal SMS – Animal Science

Success story of a farmer from Tamil Nadu

Mr. S. Vasanth, aged 25 residing at Muganthanur village of Tiruvarur District in Tamil Nadu is basically a M.C.A. graduate. He selected poultry farming as a livelihood option, as he could not get appropriate job in the core segment. In continuation, he contacted Farmer Training Centre of Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) located at Tirurvarur and underwent formal two day training on "*Desi* chicken rearing", in which he learned about scientific management of *desi* chicken. He learned about production potential of *Vanaraja* and *Gramapriya* and supply of the germplasm from College of Poultry Production and Management, Hosur under ICAR – Poultry Seed Project.

Name	Mr. S. Vasanth
Address	
Qualification	M.C.A.
Age	25
Mobile No:	
Nature of Venture	
Nature of services	
Annual Turnover	
Farm size (ha)	
No. of Employment	
Documented by:	

The farmer purchased 80 *Gramapriya* chicks on 10.07.2018 and practiced scientific management, and he could grow alive 78 birds with only 2 chick mortality. The farmer follows semi-intensive system of management with supplementary concentrate feeding. He prepares his own concentrate feed along with Azolla and termite production, which were used for supplementary feeding, in addition to grazing. The farmer kept all the female birds for egg laying and sold the male birds for meat purpose. The males were sold at the rate of Rs. 200 per kg and the female started laying eggs at the age of 21 weeks. The eggs are sold at the rate of Rs. 10 per egg. He keeps record of all expenditures such as feed, medicine etc. and income in a Register. He spent Rs. 13,199 for chick, feed, vaccine etc. and his income was 39,824 from sale of the male birds and eggs from the female birds, and earned a net profit of Rs. 26,625 from the batch.

The farmer purchased 50 *Gramapriya* chicks on 25.12.2018 from College of Poultry Production and Management, Hosur under ICAR – Poultry Seed Project. The farmer profoundly thanked ICAR-Poultry Seed Project and TANUVAS, CPPM and FTC for all the support rendered to him for successful entrepreneurship on the poultry farming.

Success story of a farmer from Tamil Nadu

Mr. A. Senthil Kumar, residing at Bajanai koil St., Maduramangalam village of Kanchipuram districtof Tamil Nadu is ahandicapped agricultural labour belonging to SC community. The farmer contacted Farmers Training Centre of TANUVAS located at Kanchipuram for getting advice on rearing native chicken and underwent training on rearing of *Vanaraja* and *Gramapriya* chicken as an entrepreneurship option. After the training, the farmer receivedfirst batch of each hundred number of *Vanaraja* and *Gramapriya* day old chicks during 2017 from College of Poultry Production and Management, Hosur under ICAR-Poultry seed project.

The farmer has been rearing *Vanaraja* for meat purpose and *Gramapriya* for egg laying purpose, under free range system after a 21 days period of brooding management. The *Vanaraja* birds attains a body weight of 1.3-1.5 kg at the age of 105-110 days and the birds were being sold at the rate of Rs. 200-220 per kg body weight. The farmer has been earning a net profit of Rs. 180-200 per bird.

The farmer also reared *Gramapriya* for producing native chicken eggs. He got 60-70 eggs per day from the batch and sold the egg at the rate of Rs. 10-12 per eggs. He earned a net profit of Rs. 5 per egg and Rs. 300 per day. This profit in the first batch gave him a confidence in *Vanaraja* and *Gramapriya* rearing and the farmer has regularly been purchasing a batch of 75-100 chicks of *Vanaraja* and *Gramapriya* once in three months from CPPM, Hosur under ICAR-Poultry Seed Project through FTC, Kanchipuram.

The continuous rearing of *Vanaraja* and *Gramapriya* birds transformed the farmer from an agricultural labour to a poultry farmer. The success of the farmer has been recognized by TANUVAS and the farmer was awarded with "The Best Native Chicken Farmer" award during 2018 in *Kisan Mela* 2018 held at Coimbatore, Tamil Nadu. All these happened only because of basic germplasm supply through ICAR-Poultry Seed Project and the farmer profoundly thanked ICAR-Poultry Seed Project and TANUVAS (The farmer's contact No: 07708401664).

Success story of Small poultry farmers in Manipur

K Lalita (47 years) a farmer from Japhou village Chandel suffered from financial crisis and struggle for survival with her four children. She reared some 200 number of *Srinidhi* birds supplied from ICAR Poultry seed project, Manipur centre in the backyard as a source of income for household maintenance. She has some knowledge about poultry rearing in backyard systm without much scientific knowledge on feeding and disease management. So she has attended training programme conducted by ICAR KVK Chandel.Now she is happy with the income received from rearing poultry and able to feed and sent her childern to school.

Name & Age	Mrs K. Lalita
Age	47 years
Address	Japhou village, Chandel District, Manipur
Input to the Farmers	200 numbers of *Srinidhi* chicks
Rearing system	deep Litter System
Cost of feeds for 120 layers till 72 weeks	50 bags x Rs .1900=Rs. 95,000.00
Sale of excess male birds @200/kg	45 birds X 3.0kg , 135kg x Rs. 200 = Rs27,000.00
Sale of litter@Rs.5/kg	200kg x Rs.5 =Rs.2000
Sale of Eggs@Rs.10/egg	Rs.10 X 53 eggs =Rs. 530
Daily income from sale of eggs	Rs. 530
Income from eggs for 50 weeks	350xRs 530
Net Profit Annual	Rs. 1,19,500.00
Average monthly income	Rs 9,958/-

Success story of Miss Kimnihoi (45yrs)

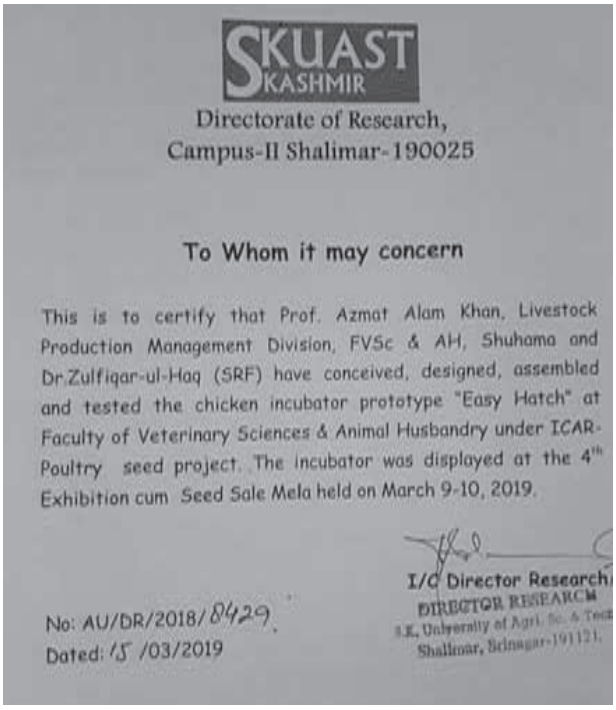
Name	Miss Kimnihoi
Age	45yrs
Address	Ringkhu village, Chandel District, Manipur
Input to the Farmers	200 numbers of *Vanaraja* chicks
Rearing system	deep Litter System
Cost of feeds for 150 Birds till 72 weeks	50 bags x Rs .1900=Rs. 95,000.00
Sale of excess male birds @200/kg	25 birds X 3.0 kg =75kg x Rs. 200= 15,000.00
Sale of Bokashi Compost @Rs.10/ kg	300kg x Rs.10 =Rs.3000.00
Sale of Eggs@ Rs.10/egg	Rs.10 X 15 eggs =Rs. 150
Daily income from sale of eggs	Rs. 150.00
Income from eggs for 50 weeks	350xRs 150
Sell of Day Old chicks@Rs. 40	40 x 4000
Net Profit Annual	1,20,600/-
Average monthly income	Rs 10,050/-

Success story of Mr. Paumuanlal Guite (25 years)

The newly developed breeds for backyard poultry including *Vanaraja* have been selected for better growth and production. In the process the broodiness trait has been compromised as this trait has inverse relationship with production. Hence new breed hens seldom show broodiness. So, natural incubation is not possible. A low cost easy to operate incubator was developed.

Name	Mr. Paumuanlal Guite
Age	25 years
Address	College Road, Vengnuam New Lamka, Churachandpur District, Manipur
Input to the Farmers	Construction of low cost housing system and 250 numbers of *Vanaraja* chicks
Rearing system	Deep Litter System
Cost of feeds for 220 Birds till 72 weeks	75 bags @ Rs.1900/bag
Sale of excess male birds @200/kg	45 birds and average 2.8 kg per male bird
Sale of Eggs@Rs.10/egg	10-15 eggs per day sold as table egg and remaining eggs were kept for incubation.
Daily income from sale of table eggs	Rs. 100.00
Income from eggs for 50 weeks	350 x Rs 100
Sell of Day Old chicks @Rs. 40	40 X 7050
Net Profit Annual	Rs. 1,48,800/-
Average monthly income	Rs 12,400/-

Design Fabrication Testing Of Shalimar Easy Hatch- A Low Cost Chicken Incubator



SKUAST KASHMIR
Directorate of Research,
Campus-II Shalimar-190025

To Whom it may concern

This is to certify that Prof. Azmat Alam Khan, Livestock Production Management Division, FVSc & AH, Shuhama and Dr.Zulfiqar-ul-Haq (SRF) have conceived, designed, assembled and tested the chicken incubator prototype "Easy Hatch" at Faculty of Veterinary Sciences & Animal Husbandry under ICAR-Poultry seed project. The incubator was displayed at the 4th Exhibition cum Seed Sale Mela held on March 9-10, 2019.

I/C Director Research
DIRECTOR RESEARCH
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No: AU/DR/2018/8429
Dated: 15 /03/2019

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Proceedings of the Annual Review Meeting of AICRP on Poultry Breeding and Poultry Seed Project

23-24 August, 2018 at ICAR- RC for NEH , Umiam

Inaugural Session

Chairman : Dr. Joykrushna Jena, DDG , (FS & AS), ICAR, New Delhi

Co-Chairman : Dr. R. S. Gandhi, ADG (AP&B), ICAR, New Delhi

Dr. R. N. Chatterjee,: Director, ICAR-DPR, Hyderabad

The Annual Review Meeting of AICRP on Poultry Breeding and Poultry Seed Project was organized by ICAR RC for NEH at Umiam on 23-24 August 2018. The Inaugural session was chaired by Dr. Joykrushna Jena, DDG (FS &AS). Dr.N. Prakash, Director, ICAR RC for NEH, Umiam welcomed all the dignitaries and principal investigators of different units. Dr. Arjava Sharma, Director, NBAGR highlighted the importance of indigenous chicken germplasm and its conservation and improvement. He stressed the information of rural chicken varieties should be shared with State Biodiversity Board. He advised the principal investigators to identify, characterize and register the available local indigenous chicken germplasm. Dr. R. N. Chatterjee, Director, ICAR-DPR, Hyderabad welcomed the dignitaries and centre incharges. He gave a brief overview of the present status and emerging challenges of rural poultry production in the country. He highlighted the significant achievements and contributions of the AICRP on Poultry Breeding and Poultry Seed Project and narrated that five location specific rural chicken varieties were developed and two native breeds were registered during last five years. Dr. R. S. Gandhi, ADG(AP&B) narrated the status of poultry production in the north eastern region and status of gap between demand and supply of poultry meat and egg. Dr. Gandhi complemented the progress made by different centres and revision of targets of well performing centres. He directed the unit incharges to involve self help groups for effective dissemination of improved varieties. Dr. Jena, DDG (FS & AS) welcomed the delegates on behalf of Council. He said that two days extensive deliberations on achievements of AICRP and PSP centres will provide new guidance and dimensions towards development and effective propagation of rural varieties. He stressed the need to strictly evaluate the performance of the centres and non-performing ones to be discontinued. He advised that a score card having proper weightage for different aspects of performance of the centres needs to be developed for evaluation purpose. He instructed the principal investigators to report the generation/ period-wise improvement obtained in the varieties developed. He also directed the coordinating unit to arrange regular meeting points for continuous evaluation of different centres at regular interval. Dr. Jena stressed that to meet out the exiting demand of superior germplasm, there is immediate need to involve KVK and entrepreneurs to achieve the target of germplasm distribution for doubling the farmers income. Dr. K.K.Baruah, Head Division of Livestock Production, ICAR RC for NEH proposed the vote of thanks.

Technical Session- I

Presentation of PCReport

Dr. R. N. Chatterjee, Director, ICAR-DPR presented the PC Report of AICRP on Poultry Breeding and PSP for the year 2017-18. He informed that AICRP centres have released five location specific rural chicken varieties and registered two indigenous chicken breeds during last five years. He appreciated the performance of Mannuthy, Bengaluru and Udaipur Centres of AICRP and Kolkata, Nagaland, Sikkim, Manipur and Hosur centres of PSP for achieving the targets. He commented that germplasm supply by Anand, CARI, Bhubaneswar, Agartala, Guwahati, Palampur and Ranchi (AICRP) and Goa, Port Blair, Srinagar (PSP) is poor and need immediate and urgent attention to improve the same to meet the targets. He stated that Agartala centre needs to speed up efforts to release location specific variety after proper field evaluation. He advised the new PSP centres to speed up the construction work to create necessary infrastructure facilities for parent rearing so that germplasm supply can be initiated. Dr. R. N. Chatterjee suggested the PIs to take necessary approval from concerned state biodiversity board for using the local native germplasm. Dr. Jena stated that after 2020 the Poultry Seed Project will be merged with AICRP on Poultry Breeding and

there is a need to incorporate research component with respect to characterization and improvement of native breeds and developing varieties. DDG (FS &AS) suggested that entrepreneurship should be developed for germplasm supply of the varieties developed under this project. He also suggested testing of improved varieties at different locations and to involve state animal husbandry department, KVK, entrepreneurs and other stakeholders. Necessary MoU needs to be developed in this regard and directed the Coordinating cell to initiate the process. Dr. R. S. Gandhi advised the PIs to return the ICAR share of revenue generated under AICRP and PSP. Guidelines regarding the utilization of revenue generation under PSP over the years will be provided and requested the DPR to submit the requisite proposal in this regard. Dr. Jena, DDG(FS&AS) informed that PIs that there will be no staff/manpower component in AICRP from 2020 onwards and enhanced budget provision will be made to hire and engage technically qualified manpower on contractual basis. He directed the coordinating cell to provide letter of appreciation to one to two centres that excelled in performance in AICRP & PSP.

ACIRP Centres

Bengaluru

Dr. C, S. Nagaraja, Incharge of the Centre presented the performance of Bengaluru centre. He has reported the positive genetic and phenotypic response in primary trait (body weight at 5 weeks) in PB-1 and PB2 lines, but negative response in egg production up to 40 weeks. Dr. Chatterjee suggested implementing effective restricted feeding protocol to maintain the target body weight at 20 weeks in pure lines. Dr. Nagaraja presented the performance of crosses in farm and field. Dr. Bhasin observed that the plumage pattern of the crosses similar to that of pure line and may not be accepted by the farmers. Dr. Chatterjee advised to select for plumage pattern in the F1.

Ludhiana

Dr. S. K. Dash, Incharge of the centre presented the achievements of Ludhiana centre. Dr. Chatterjee observed that the mortality increased across all age groups and there is reduction in fertility and hatchability parameters. He also advised the PI to strictly follow and implement the technical programme of variety development. He directed the PI to undertake selection for body weight only in Native population. Dr. R. S. Gandhi directed the coordinating cell to submit a report after three months about the performance of this centre.

Izatnagar

Dr. V.K. Saxena, Incharge of the centre presented the progress of CARI, Izanagar centre. Performance of CSML and CSFL lines almost reaching a plateau. Dr. Chatterjee enquired about the requirement of maintaining the separate control line and advised the PI to remove the control line and to get broiler control chicks from DPR during regeneration for comparison. Dr. R.S.Gandhi observed that native chick population is very heterogeneous and advised to make the population uniform before utilizing in the crosses.

Bhubaneswar

Dr. N. C. Behura, Incharge of the centre presented the progress of the Bhubaneswar centre. He informed that *Hansli* chicken population has been registered as recognized breed. Dr. R. S. Gandhi observed that performance of pure lines (CSFL and CSML) are static and needs improvement and also suggested to improve the germplasm supply.

Mannuthy

Dr. Binoj Chacko, PI of the centre presented the achievements of the Mannuthy centre. Dr.Chatterjee observed that the plumage colour of the three way cross is variable and may not be liked by the farmers. He advised the PI to first undertake purification of local native population before using in the cross. He directed Dr. U. Rajkumar to make a visit to the centre to provide guidance.

Anand

Dr. F. P. Savaliya, PI of the centre presented the progress of the Anand Centre. Dr. Chatterjee enquired about the higher mortality reported in different lines across different age groups. He also observed that performance of RIR population is very low. Dr. R.S. Gandhi suggested to strengthen the population of local native chicken population (Ankleshwar) and to regenerate about 4000 chicks. Dr. R.N.Chatterjee suggested purifying the population and making it uniform. He appreciated the egg production performance of native Ankleshwar population and directed to stop producing crosses and only to promote the native chicken. He also directed the PI to maintain layer pure lines under conservation mode

and remove the non performing RIR line. Dr. Gandhi also emphasized that there is no need to produce a cross and directed that native Ankleshwar population can be improved and propagated. He also suggested to improve the germplasm supply.

Guwahati

Dr. N. Kalita, Incharge of the centre presented the progress made by Guwahati centre. Dr.Chatterjee suggested to improve the germplasm supply. Dr. Bhasin observed that there was lot of variability in plumage colour of Kamrupa and suggested to purify the native population before utilizing in the cross. Dr. R.S. Gandhi suggested to check the performance of Kamrupa over generations. Dr. Chatterjee suggested to undertake continuous and effective selection in lines for further improvement of Kamrupa.

Agartala

Dr. Vinay Singh, Incharge of the Centre presented the progress of Agartala centre. He presented the farm and field performance of three way cross. Dr. Chatterjee observed that number of birds in field for evaluation were less and suggested to include more number of farmers and birds in the field evaluation for performance recording before release of the cross. Dr. Gandhi advised to collect data from the field in proper way from larger population size without missing.

Jabalpur

Dr. J. K. Bharadwaj, incharge of the centre presented the achievements made by Jabalpur centre. Dr. Jena, DDG(FS &AS) suggested to concentrate on *Kadaknath* and to maintain larger population for selective breeding. He also suggested entrepreneurship development for propagation of Narmadanidhi, because centre alone cannot fulfill the demand. He also suggested to involve State AH department in the process. Dr. Chatterjee suggested to identify the entrepreneurs immediately for propagation of Narmadanidhi and intimate to the DPR.

Udaipur

Dr. S. K. Misra, Incharge of the centre presented the progress of Udaipur centre. DDG(AS) suggested entrepreneurship development for propagation of Pratapdhan. He also suggested to maintain native population in large numbers for further improvement. Dr.Chatterjee suggested to further improve the performance of Pratapdhan based on demand and preference of farmers. Dr. Gandhi suggested to take proper biosecurity measures to control the mortality.

Palampur

Dr. Varun Sankyan, Asst. Professor presented the progress of Palampur centre. Dr. Chatterjee suggested to identy entrepreneurs for effective propagation of Himsamridhi. Dr. Gandhi suggested to take proper biosecurity measures to control the mortality. Germplasm supply also needs improvement.

Ranchi

Dr. Sushil Prasad, Incharge of the centre presented the progress of Ranchi Centre. Dr. Gandhi suggested to increase the germplasm supply through linking with KVKs, AH Department, NGOs and entrepreneurs for effective supply of *Jharsim*.

Technical Session II

Poultry Seed Project

Nagaland

Dr. Mahek Singh, Scientist presented the progress of Nagaland Centre. Dr. Chatterjee appreciated the efforts made by the centre in germplasm supply in spite of several constraints. Dr. Bhasin enquired about the demand of chicks in the locality. Dr. Singh replied that there is a demand for both *Vanaraja* and *Srinidhi*. Dr.Gandhi suggested to identify entrepreneurs to meet the higher demand for improved varieties.

Barapani

Dr. S. K. Doley, presented the progress of the centre. He informed that infrastructure development is in progress. Dr.Chatterjee suggested to procure parents as early as possible from DPR. Target of germplasm supply has been revised to 50,000. Dr. Gandhi suggested to obtain regular feedback from farmers including economic analysis.

Sikkim

Dr. Rafiqul Islam, Scientist presented the progress made by the centre. He expreesed the constraints of space for rearing parents. Dr.Chatterjee informed that necessary budget allocation has been made under works and necessary revalidation will be considered as per the Council guidelines. Efforts of the project team were appreciated for meeting the target supply. Dr. Gandhi suggested to submit the success stories to ICAR News for publication.

Manipur

Dr. Sonia Chongtham, Scientist presented the progress of the centre. This centre achieved the target of germplasm supply. Dr. Chatterjee suggested reporting the egg production performance in the field conditions and feedback of the farmers. Dr. Gandhi suggested to maintain database of farmers and beneficiaries.

Kolkata

Dr. S. Pan Professor presented the progress of the centre. He presented the field performance of parent lines in farm and *Vanaraja* in field conditions. Dr. Chatterjee suggested to indentify entrepreneurs/NGOs to enhance the supply of germplasm.

Patna

Dr.Pankaj Kumar, Incharge of the centre presented the progress made by the centre. Dr. Chatterjee suggested to implement restricted feeding protocol effectively to maintian the target body weight at 20 weeks of age. Dr. Bhasin suggested to explore the possibility of introducing *Jharsim* variety in Bihar. Dr. Chatterjee advised to collect feedback from farmers along with economic analysis. The germplasm supply target was revised to 70,000.

Hosur

Dr. S. Shamsuddin, presented the progress of the centre. He informed that there is high demand for Grampriya compared to *Vanaraja*. The centre has achieved the target supply. Dr. Chatterjee advised to collect feedback from farmers along with economic analysis.

Portblair

Dr. T. Sujatha, Scientist presented the progress of the centre.Dr. Gandhi suggested improving the performance and germplasm supply. Dr. Chatterjee suggested to involve KVK in the supply of germplasm and to obtain farmers feedback. Dr. R. S. Gandhi directed the coordinating cell to submit a report after three months about the performance of this centre.

Srinagar

Dr. A. A. Khan, presented the progress of the centre. He informed that necessary hatchery facility was developed. Dr. Chatterjee suggested to improve the germplasm supply. Dr. Bhasin advised the PI to test the performance of improved variety at Leh. Dr. Chatterjee advised to collect feedback from farmers along with economic analysis.

Goa

Dr. Nibedita Nayak, incharge of the centre presented the progress report. Dr. Chatterjee suggested to improve the germplasm supply and to concentrate on *Srinidhi* variety only.

Warangal

Dr. M. Gnanaprakash, Professor presented the report of the centre. He informed that centre initiated the parent rearing in the existing facility and infrastructure development is in progress. Dr.Chatterjee suggested to speed up the construction process for early completion. Dr. Bhasin suggested to undertake a survey to know the demand of the farmer for meat, dual or egg type variety.

Tirupati

Dr. A. Ravi, Professor presented the progress of the centre. He informed that centre initiated the parent rearing in the existing facility and infrastructure developed is in progress. Dr.Chatterjee suggested to speed up the construction process for early completion.

Dr. U. Rajkumar, Incharge, AICRP, DPR presented the technical program and action plan for the next year. The exiting technical program will be continued with slight modification proposed in this review meeting. He proposed that entrepreneurship development will be made for increasing the germplasm supply. Format for MoUfor commercialization of technology will be prepared with the approval of the Council. Purification of native chickenshould be done before utilization in crosses. All the centres will be involved in improvement of indigenous recognized breeds / identification, characterization and registration of native chicken. Anand centre will work on Ankaleswar breed improvement.

Plenary Session

Dr. Chatterjee, congratulated all PIs for progress made and informed them to increase the output. He suggested the PIs for entrepreneurship development for enhancing the supply. Initially, 2-3 entrepreneur per centre needs to be identified for propagation of the varieties developed/indigenous chicken. He informed that PSP centres will be merged with AICRP-PB after 2020 and requested the PIs of PSP centres to come

with a suitable action plan and proper justification for the same. Dr. Gandhi suggested that feedback and socio economic analysis is mandatory for all the centres. He directed all the PIs to submit the success stories and video clips. Dr. Gandhi directed to compile the generation wise performance of pure lines and varieties and directed the PIs to submit the database and performance report to coordinating cell.

Dr. J.K. Jena, (DDG(FS &AS) directed the PIs to submit the list of publications made by each centre since inception and also to submit the soft copy of publications made during last five years. He suggested to invite one or two external experts during the annual review meeting. He also advised to hold consultation meeting by involving experts, stakeholders, industry, farmers and scientists to discuss and decide the future plan. Dr. Jena directed the coordinating cell to submit the proposal regarding constitution of variety release committee. He also informed that non performing centres will be discontinued. Dr. S. Doley, PS, proposed the formal vote of thanks.

Recommendations

General

1. The AICRP on Poultry Breeding and Poultry Seed project is proposed to be merged to one network project by April 2020.
2. All AICRP and PSP centres should submit the list of publications made since inception and soft copy of publications made during last five years with their impact factor to coordinating cell at ICAR-DPR.A copy of publication made by the units needs to be submitted to PC cell every year. Due acknowledgement has to be given to AICRP-PB/PSP, ICAR in the publications.
3. All AICRP and PSP centre should strictly follow the approved technical programme.
4. All the PIs should come out with impact analysis of the technology.
5. All centres should provide output and outcome details in the annual report.
6. Success stories with detailed economic analysis as per the proforma should be submittedalong with video clips (2-3 minutes duration).

AICRP-PB

1. All the centres should start the process of entrepreneurship development. Initially, 2-3 entrepreneurs per centre need to be identified for propagation of improved chicken varieties/ indigenous chicken. The PC cell will develop the modalities after receiving the approved guidelines for sharing of parent lines to the private agencies.
2. After merging of AICRP on PB and PSP, the objectives will be revised towards the conservation and improvement of native germplasm like Ankaleshwar at Anand; Daothigiri at Guwahati; Ghagus at Bengalure; Tellichery at Trissur etc., will be taken up under the new program.

PSP

1. All Centres should make efforts to increase the germplasm supply.
2. PIs are requested to submit the activities to be undertaken by the centre after 2020 keeping in view of merging with AICRP on Poultry Breeding. Suitable research proposal with proper justification is to be submitted for consideration.
3. Database of beneficiaries needs to be maintained along with their feedback.

Action Taken Report on the recommendations of AICRP and PSP Annual Review Meeting

23-24 August, 2018 at ICAR- RC for NEH , Umiam

Sl No	Recommendations	Action Taken
General		
1	The AICRP on Poultry Breeding and Poultry Seed project is proposed to be merged to one network project by April 2020.	Complied with. All centres were informed.
2	All AICRP and PSP centres should submit the list of publications made since inception and soft copy of publications made during last five years with their impact factor to coordinating cell at ICAR-DPR. A copy of publication made by the units needs to be submitted to PC cell every year. Due acknowledgment has to be given to AICRP-PB/PSP, ICAR in the publications.	Informed to all the centre. Publications were compiled.
3	All AICRP and PSP centre should strictly follow the approved technical programme.	Complied with.
4	All the PIs should come out with impact analysis of the technology.	The PIs are again instructed to study the impact.
5	All centres should provide output and outcome details in the annual report.	Informed to all the centre. The information from some centres is awaited. the compilation is progress.
6	Success stories with detailed economic analysis as per the proforma should be submitted along with video clips (2-3 minutes duration).	Complied with.
AICRP-PB		
1	All the centres should start the process of entrepreneurship development. Initially, 2-3 entrepreneurs per centre need to be identified for propagation of improved chicken varieties/indigenous chicken. The PC cell will develop the modalities after receiving the approved guidelines for sharing of parent lines to the private agencies.	Some centres are already developed small scale entrepreneurs. The process sharing germplasm to private will be initiated as per the council approved guidelines
2	After merging of AICRP on PB and PSP, the objectives will be revised towards the conservation and improvement of native germplasm like Ankaleshwar at Anand; Daothigiri at Guwahati; Ghagus at Bengalure; Tellichery at Trissur etc., will be taken up under the new program.	Complied with.
PSP		
1	All Centres should make efforts to increase the germplasm supply.	Complied with.
2	PIs are requested to submit the activities to be undertaken by the centre after 2020 keeping in view of merging with AICRP on Poultry Breeding. Suitable research proposal with proper justification is to be submitted for consideration.	PIs are again instructed to submit the detailed proposals.
3	Database of beneficiaries needs to be maintained along with their feedback.	Complied with.

Publications

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Vanaraja birds under integrated farming at Kolkata

A Manipur women farmer with improved chicken variety

Farmer with backyard chicken at Nagaland centre

A women farmer with rural variety at Sikkim

Backyard rearing of chicken in Sikkim

Manipur women farmer with eggs from backyard chicken

Field unit of *Himsamridhi*

Adult flock of *Hansli* at Bhubaneswar centre

Semi-intensive rearing of *Jharsim*

A progressive farmer rearing *Kamrupa* birds

A pair of native birds at Anand centre

Flock of PB-2 birds at Bengaluru centre

Native birds at Mannuthy centre

Monitoring of field unit at Tripura

A tribal farmer with *Himsamridhi*

Punjab Brown birds at Ludhiana centre


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