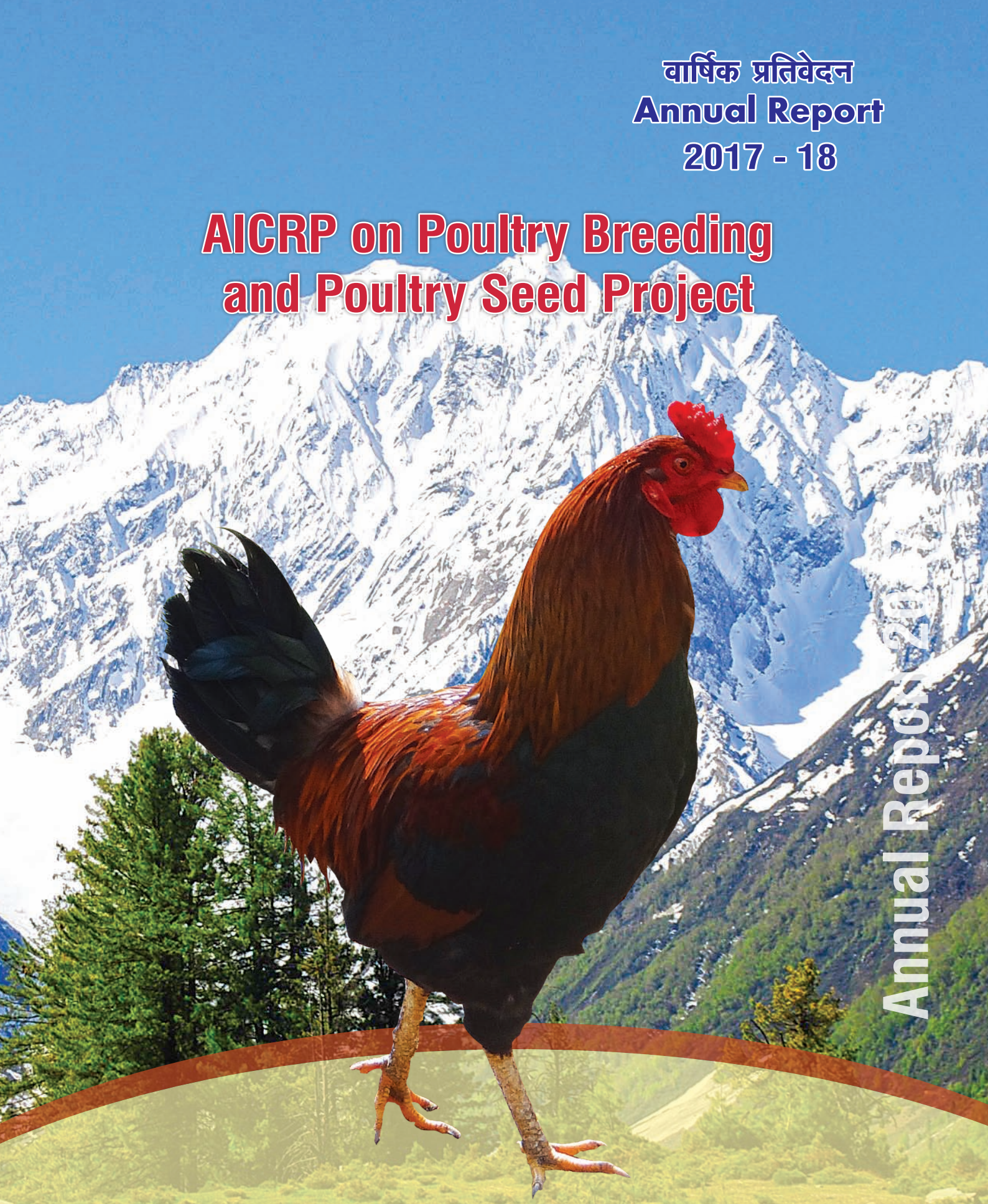
वार्षिक प्रतिवेदन

Annual Report 2017 - 18

AICRP on Poultry Breeding and Poultry Seed Project



Annual Report 2017-18

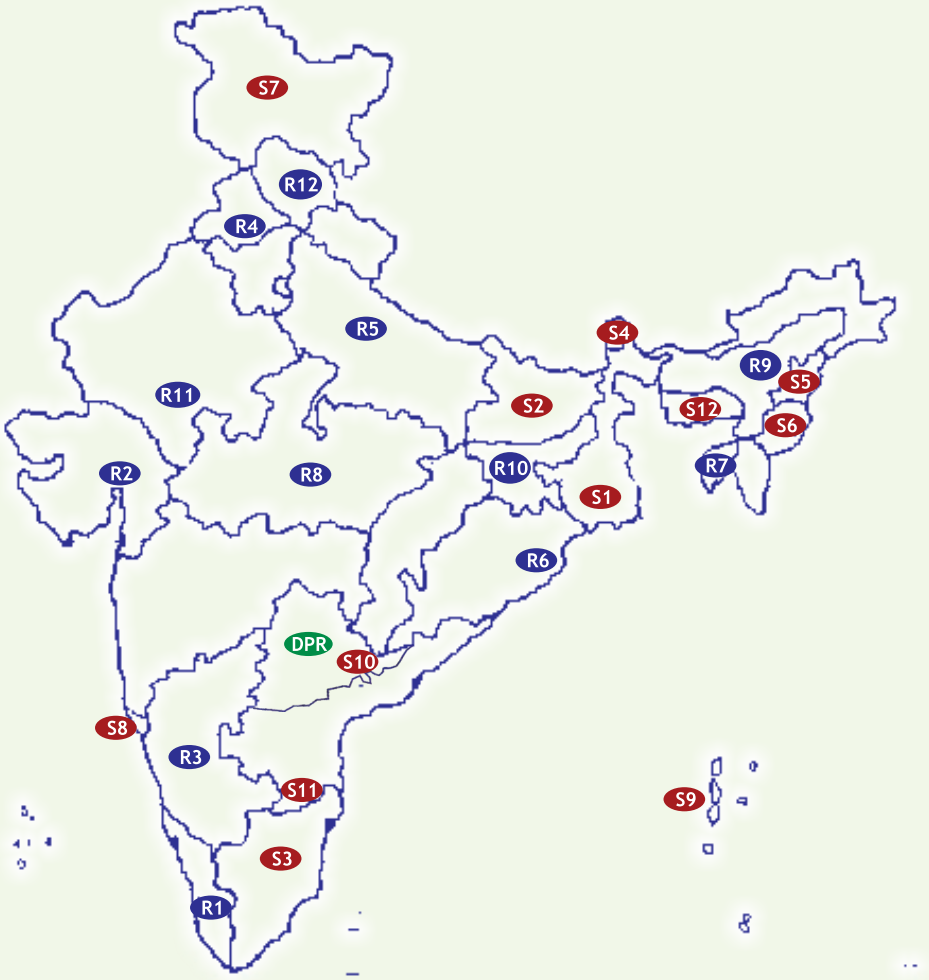
भाकृअनुप - कुक्कुट अनुसंधान निदेशालय

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-NOFRI, Sikkim
S5.	ICAR RC, Nagaland
S6.	ICAR RC, Manipur
S7.	SKUAST, Srinagar
S8.	ICAR-CCARI, Goa
S9.	ICAR-CIARI, Portblair
S10.	PVNRTVU, Warangal
S11.	SVVU, Tirupati
S12.	ICAR-RC for NEHR, Barapani

AICRP on Poultry Breeding
and
Poultry Seed Project

Annual Report
2017-18

भाकृअनुप - कुक्कुट अनुसंधान निदेशालय
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Front Cover
Himsamridhi bird

Inside Front cover
Location of AICRP & PSP Centres

Inside Back Cover
Kolkata Centre of Poultry Seed Project

Back Cover
Administrative cum Laboratory building

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Preface

The ICAR-Directorate of Poultry Research is mandated to carryout the research in frontier areas of poultry production in the country under the umbrella of Indian Council of Agricultural Research. 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 2017-18.

The AICRP on Poultry Breeding has been reoriented towards the rural poultry and all the centres are currently working on development of 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. During the year, a dual purpose variety *Himsamridhi* was developed and released at CSKHPKVV, Palampur centre for the benefit of hilly and tribal regions of the country. 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. During the current plan two new centres (SVVU, Tirupati and PVNRTVU, Warangal) were added to cater to the needs of the farmers in Andhra Pradesh and Telangana. The untiring efforts of all the staff of AICRP on Poultry Breeding and Poultry Seed project lead to the effective propagation of backyard poultry. Five success stories have been reported during the year from different centres. During the year 2017-18, a total of 14.86 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. A total of Rs. 436.37 lakhs revenue was generated by supplying improved chicken germplasm by AICRP&PSP Centres.

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 of this 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 : 07-07-2018

(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

Contents

Poultry Seed Project

कार्यकारी सारांश

कुक्कुट प्रजनन पर अखिल भारतीय समन्वयन अनुसंधान परियोजना (एआईसीआरपी)

वर्ष 2014-15 के दौरान 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, एमपीपीसीवीवीवी, जबलपूर, एएयू, गुवाहाटी, बीएयू, रांची, एमपीयूएटी, उदयपूर एवं सीएसकेएचपीकेवीवी, पालंपूर है। परियोजना का मुख्य उद्देश्य ग्रामीण, आदिवासीय एवं खुले 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 और आईडब्ल्यूपी) को बनाए रखे हैं। केवीएएफएसयू, बेंगलूरू जीएडीवीएएवयू, लुधियाणा, ओयूएटी, भुवनेश्वर, सीएआरआई, इज्ज़तनगर केंद्र चार विशिष्ट ब्रायलर जर्मप्लाज्म (पीबी-1, पीबी-2, सीएसएमएल तथा और सीएसएफएल) को बनाए रखे हैं।

भाकृअनुप-कुक्कुट अनुसंधान निदेशालय में दो यादृच्छिक नियंत्रण वंशावलियों (लेयर के लिए एक और 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 और 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 **2017-18** के दौरान रूपए **2,61.11** का कुल राजस्व प्राप्त करते हुए विभिन्न केंद्रों के किसानों को कुल **854261** कुक्कुट जर्मप्लाज्म वितरित किए गए।

केवीएएसयू, मन्नुति केंद्र ने 40 सप्ताह तक देशी कुक्कुट जर्मप्लाज्म की एस-2 पीढ़ी का मूल्यांकन किया। 40 सप्ताह की आयु तक देशी कुक्कुट जर्मप्लाज्म का अंडा उत्पादन 75.96 ग्राम के औसत अंडे के वजन के साथ 75.96 अंडे रहा। अंडे के उत्पादन में 3.88 अंडों की वृद्धि हुई और एस-2 पीढ़ी में अंडे का वजन 0.7 ग्राम बढ़ा। एस-3 पीढ़ी में अच्छी प्रजनन क्षमता (90.04%) और हैचबिलिटी (एफईएस और टीईएस पर 94.27 और 84.89%) देखी गई। एस-3 पीढ़ी में यौन परिपक्वता पर आयु 154.2 दिन रही। त्रिमार्गीय संकर (एनडीआर) का फार्म और क्षेत्र परीक्षण किए गए। खुले आंगन की स्थिति में एनडीआर का 40 सप्ताह तक अंडे का उत्पादन 80.87 अंडे रहा तथा क्षेत्र की स्थिति में यह 49.73 अंडे रहा। इसके अलावा, केंद्र ने लेयर नियंत्रण जीवियों के साथ एस-30 पीढ़ी को 40 सप्ताह तक आईडब्ल्यूएन और आईडब्ल्यूपी के उपभेदों का मूल्यांकन किया। इस पीढ़ी में 40 सप्ताह की आयु तक आईएनडब्ल्यू (120.23) में 2.51 अंडों का उत्पादन हुआ, जबकि आईएनडब्ल्यू (124.83) में फिनोटाइपिक पैमाने पर 3.8 अंडों की वृद्धि हुई। केंद्र ने इस अवधि के दौरान रु. 53.84 लाख का राजस्व अर्जित किया, जो दाना पर किए गए कुल व्यय का 218.15% (24.68 लाख रुपये) है। केंद्र ने वर्ष के दौरान कुल 216397 संख्या जर्मप्लाज्म की आपूर्ति की।

एएयू, आनंद केंद्र में 40 सप्ताह (आरआईआर और स्थानीय) तक एस-1 पीढ़ी के आरआईआर नस्लों के कुक्कुटों एवं उनके एफ-1 एवं त्रिमार्गीय संकरों का और 64 सप्ताह (एफ 1 और त्रिमार्गीय संकरों) तक मूल्यांकन किया गया। आरआईआर (68.5) की तुलना में 40 सप्ताह तक अंडे का उत्पादन स्थानीय कुक्कुट (71.3) में अधिक था, जबकि आरआईआर नस्ल में 40 सप्ताह की आयु में शरीर का वजन और अंडे का वजन अधिक था। देशी (एस-2), आरआईआर (एस-0) और एफ-1 संकर एवं त्रिमार्गीय संकर के चूज़ों को उत्पन्न किया गया। देशी कुक्कुटों (77.10%) की तुलना में आरआईआर कुक्कुटों (81.35%) में हैचबिलिटी बेहतर रही। 40 सप्ताह तक अंडे का उत्पादन आईडब्लूपी नस्ल (110.4) की तुलना में आईडब्ल्यूएन (120.7) में अधिक रहा जो पिछली पीढ़ी की तुलना में सुधार हुआ। केंद्र ने रु. 18.41 लाख का राजस्व अर्जित किया, जो दाना लागत (25.62 लाख) के व्यय का 71.62% रहा। केंद्र ने कुल 49036 जर्मप्लाज्म की आपूर्ति की।

बेंगलुरु केंद्र में स्थानीय कुक्कुट जर्मप्लाज्म के प्रदर्शन का मूल्यांकन किया गया। कुल2238 चूज़ों को गृहों में रखा गया और 8, 12 एवं 20 सप्ताह की आयु में शरीर का वजन क्रमश: 477.8, 785.6 और 1110 ग्राम रहा। यौन परिपक्वता की औसत आयु 165.47 दिन रही। पीबी-1 नर कुक्कुटों को स्थानीय गैर-वर्णन विविधता कुक्कुटों के साथ संकरित किया गया जिससे 315 चूज़ों का उत्पादन किया गया। एफ-1 नर कुक्कुटों का औसत शरीर का वजन 886.9 और मादाओं का वज़न 768.8 ग्राम रहा। एफसीआर मूल्य 2.98 रहा। पीबी-1 और पीबी-2 वंशावलियों में एक दिन की आयु एवं 5 सप्ताह की आयु में शरीर का वजन बढ़ा है। पीबी-1, पीबी-2 और कंट्रोल लाइनों में 40 सप्ताह की आयु (उत्तरजीवी आधार) पर औसत अंडा उत्पादन क्रमश: 57.01, 56.9 और 66.1 अंडे रहा। पीबी-1 में पिछले 11 पीढ़ियों की तुलना में 5 सप्ताह में शरीर के वजन की औसत फिनोटाइपिक और आनुवांशिक प्रतिक्रिया क्रमशः 14.4 और 24.4 ग्राम रही। पिछले 12 पीढ़ियों की तुलना में 5 सप्ताह में पीबी-2 में अनुरूप मूल्य क्रमशः 9.25 और 17.08 ग्राम रही। गुड़गांव में आयोजित 47 वें आरएसपीपीटी परीक्षण में राजा-II (पीबी-1 x पीबी-2) में 6 और 7 सप्ताह की आयु में औसत शरीर का वजन क्रमश:1692 और 2080 ग्राम रहा। 0-7 सप्ताह के बीच दाना दक्षता मूल्य 1.56 रहा। ड्रेसिंग प्रतिशत 71.5 रहा। कुल 2,10,086 जर्मप्लाज्म (1,91,922 एक दिन की आयु के चूज़ों एवं 18,164 हैचिंग अंडे) को 397 हितधारकों को आपूर्ति किया गया। केंद्र ने रु.54.98 लाख का राजस्व अर्जित किया, यह दाना लागत पर व्यय का 168.18% (32.69 लाख) है।

लुधियाणा केंद्र में स्थानीय देशी कुक्कुट जर्मप्लाज्म का मूल्यांकन किया और स्थानीय देशज कुक्कुट के कुल 1435 अच्छे चूज़ों को सेना गया। देशज जर्मप्लाज्म का शरीर वजन एक दिन की आयु, 4 और 8 सप्ताह की आयु में क्रमश: 38.47, 572.1, 737.9 ग्राम रहा। 4 सप्ताह में पीबी-2 X देशज का शरीर का वजन खुले आंगन में 612.0 ग्राम और क्षेत्र में 359.1 ग्राम रहा। 40 सप्ताह तक पीबी-2 X स्थानीय कुक्कुटों का क्षेत्रों में अंडे का उत्पादन 77.2 अंडे रहा। पीबी-1, पीबी-2 और कंट्रोल लाइनों में 5 सप्ताह की आयु में औसत शरीर का वजन क्रमशः 1200, 934.4 और 871.3 ग्राम रहा। पिछले पुश्तों की तुलना में 5 सप्ताह की आयु में पीबी-1 वंशावली में शरीर का वजन बढ़ा है और पीबी-2 और कंट्रोल लाइन में यह कम हुआ। पिछले 11 पीढ़ियों में जेनेटिक प्रतिक्रिया पीबी-1 में 22.09 ग्राम और पीबी-2 जीवियों में 11.9 ग्राम रहा। 170 हितधारकों को कुल 68,829 जर्मप्लाज्म (64,413 एक दिन की आयु के चूज़े एवं 4,416 वयस्क कुक्कुटों) की आपूर्ति की गई। इस केंद्र ने रू.16.96 लाख का राजस्व अर्जित किया जो दाना पर व्यय लागत का 105.33% (16.10 लाख रुपये) है।

सीएआरआई केंद्र ने स्थानीय देशज कुक्कुट जर्मप्लाज्म का मूल्यांकन किया और 744 अच्छे चूज़ों का उत्पादन किया। एक दिन की आयु, 2, 4 और 6 सप्ताह में स्थानीय देशज कुक्कुट जर्मप्लाज्म का शरीर वजन क्रमश: 38.4, 124, 29.1.03 और 543.9 ग्राम रहा, 5 सप्ताह तक की आयु तक मृत्यु दर 3.45% रही और 6-20 सप्ताह की अवधि में देशज कुक्कुटों में यह 9.79% रहा। देशज X देशज और देशज X सीएसएमएल संकर प्राप्त किए गए और इनके विभिन्न पैरामीटर दर्ज किए गए। पहले हैच में सीएसएमएल और सीएसएफएल के कुल 1180 और 1170 अच्छे चूज़ों को सेना गया। सीएसएमएल X देशज चूज़ों का शरीर वजन एक दिन की आयु, 2, 4 और 6 सप्ताह में क्रमशः 35.86, 152.7, 420.4 और 794.1 ग्राम रहा। सीएसएमएल और सीएसएफएल में 5 सप्ताह में शरीर का वजन बढ़ा है। सीएसएमएल, सीएसएफएल और नियंत्रण में 5 सप्ताह की आयु में एफसीआर क्रमश: 2.12, 2.02 और 2.25 रहा। पिछली पीढ़ी की तुलना में सीएसएमएल में 40 सप्ताह में अंडे का उत्पादन बढ़ा है। 5 सप्ताह में सीएसएमएल और सीएसएफएल में प्रति पीढ़ी के शरीर के वजन की फिनोटाइपिक प्रतिक्रिया क्रमशः 15.96 और 15.85 ग्राम रही। आनुवांशिक प्रतिक्रिया क्रमशः 14.34 और 14.19 ग्राम रही। 6 राज्यों के किसानों और उद्यमियों, एएच विभाग, केवीके इत्यादि सहित 22 लाभार्थियों को कुल 43084 जर्मप्लाज्म (11795 ऊर्वर अंडे और 31289 एक दिन की आयु के चूज़े) की आपूर्ति की गई तथा रु. 35 लाख राजस्व अर्जित किया।

भुवनेश्वर केंद्र में मूल हंसली कुक्कुट वंशावलि को भाकृअनुप-एनबीएजीआर के साथ प्रवेश संख्या INDIA_CHICKEN_1500_HANSLI_12018 के साथ पंजीकृत किया गया। हंसली के कुल 1148 अच्छे चूज़ों का उत्पादन किया गया। हंसली में उर्वरता प्रतिशत 84.05% रही और टीईएस और एफईएस के आधार पर हैचबिलिटी प्रतिशत क्रमश: 74.17 और 88.31% रही। एक दिन की आयु में और 8 सप्ताह में देशज कुक्कुट का औसत शरीर का वज़न क्रमश: 30.2 9 और 556.5 ग्राम रहा। हंसली में 40 सप्ताह तक अंडे का उत्पादन 20.18 रहा। सीएसएमएल X हंसली और हंसली X सीएसएमएल संकर का मूल्यांकन कार्य प्रगति पर है। सीएसएमएल X हंसली में एक दिन की आयु और 5 सप्ताह की आयु में शरीर का वजन क्रमशः 30.44 और 548.8 ग्राम रहा। हंसली X सीएसएमएल का सहसंबंधित शरीर का वजन क्रमशः 40.20 और 566.2 ग्राम रहा।

सीएसएफएल और सीएसएमएल वंशावली में 0-5 सप्ताह के दौरान मृत्यु दर क्रमशः 4.52 और 4.84% रही। चालू वर्ष में सीएसएफएल और सीएसएमएल में 5 सप्ताह में शरीर का वजन स्थिर रहा। सीएसएफएल और सीएसएमएल वंशावलियों में ईपी 40 तथा ईपी 52 के रूप में वृद्धि हुई। क्षेत्रों में 7 वें सप्ताह के दौरान वजन, एफसीआर और मृत्यु दर क्रमशः 2152 ग्राम, 2.12 और 0.67% रहा। इस केंद्र ने किसानों को कुल 31685 एक दिन की आयु के चूज़ों की आपूर्ति की है। केंद्र ने रु.8.76 लाख राजस्व अर्जित किया जो कुल दाना पर व्यय लागत का 50.78 प्रतिशत है।

त्रिपुरा केंद्र ने त्रिपुरा ब्लैक, दहलम रेड, मादा ब्रायलर वंशावली और बीएन संकर का मूल्यांकन किया। ई-2 पीढ़ी में त्रिमार्गीय संकर का मूल्यांकन भी किया गया। संस्थान के फार्म में एवं किसानों के क्षेत्र में दोहरी विविधता वाले कुक्कुटों (बीएनडी संकर) का प्रदर्शन मूल्यांकन किया गया। पिछली पीढ़ी की तुलना में सभी वंशावलियों में कुल रखे गए अंडों पर सेननता में सुधार देखा गया। ब्रूडिंग अवधि के दौरान मृत्यु दर त्रिपुरा ब्लैक (4.30%) और दहलम रेड जीवियों (4.70%) में सबसे कम थी। त्रिपुरा ब्लैक, दहलम रेड, रंगीन ब्रायलर मादा वंशावली और बीएन क्रॉस में 8 सप्ताह की आयु में शरीर का वजन क्रमशः में 316.4, 544.2, 1044 और 550.1 ग्राम रहा। त्रिपुरा ब्लैक, दहलम रेड, रंगीन ब्रायलर मादा वंशावली और बीएन क्रॉस में 20 सप्ताह का शरीर वजन 1105.68, 1720.28, 3240 और 1590 ग्राम रहा। ई-2 के मूल्यांकन के दौरान 72 सप्ताह में बीएनडी संकर खुले आंगन और क्षेत्र की स्थितियों के तहत अंडे का उत्पादन क्रमश:141 और 119 अंडे रहा। वर्ष 2017-18 के दौरान 501 लाभार्थियों को कुल 20,913 जर्मप्लाज्म (20,913 चूज़ों) की आपूर्ति की गई। केंद्र ने रु. 10.54 लाख राजस्व अर्जित किया, जो दाना लागत पर व्यय का 48.88% (21.56 लाख रुपये) है।

जबलपुर केंद्र ने 52 सप्ताह की आयु तक कड़कनाथ और जबलपुर रंगीन कुक्कुट जीवियों की जी-8 वीं पीढ़ी का मूल्यांकन किया। 52 सप्ताह तक नर्मदानिधि कुक्कुटों को खुले आंगन और क्षेत्रों में मूल्यांकन किया। कड़कनाथ और जबलपुर रंगीन जीवियों का 6 सप्ताह की आयु में शरीर का वजन क्रमश: 397 और 827 ग्राम रहा। जबलपुर रंगीन में अंडे का वजन 58.7 और कड़कनाथ में 47.8 ग्राम रहा। 40 सप्ताह तक अंडे का उत्पादन जेएनबी में 88.9 और कड़कनाथ में 54.6 अंडे रहा। सीएसएफएल में 40 सप्ताह तक अंडे का वजन और उत्पादन क्रमशः 60.1 ग्राम और 62.0 अंडे रहा। नर्मदानिधि ने खुले आंगन परिस्थितियों में 40 सप्ताह तक 66 अंडे उत्पन्न किए। क्षेत्रीय स्थितियों में यह 40, 52 और 72 सप्ताह तक क्रमश: 44, 85.2 और 168 अंडे उत्पादित किए। खुले आंगन और क्षेत्र स्थितियों दोनों में अंडा उत्पादन में कमी हुई। कुल 51851 जर्मप्लाज्म (20796 चूज़ों, पठोर, पुलेट और 31055 सेनन अंडे) को 217 लाभार्थियों को आपूर्ति किया गया। केंद्र ने रु.14.46 लाख राजस्व अर्जित किया जो दाना पर व्यय लागत का 73.5% (19.97 लाख) है ।

गुवाहाटी केंद्र ने 52 सप्ताह तक देशी, दहलम रेड, पीबी-2 और बीएन जीवियों का मूल्यांकन किया। खुले आंगन और क्षेत्र की स्थितियों में 52 सप्ताह की आयु तक कामरूपा का मूल्यांकन किया। सभी झुंडों की औसत उर्वरता 87.67% पायी गयी। ब्रूडिंग और बढ़ने की अवधि के दौरान मृत्यु दर सभी वंशावलियों में 9.96% से नीचे रही। 5 सप्ताह का शरीर का वजन देशज में 126.6, पीबी-2 में 1035 और दहलम रेड में 350.2 ग्राम रहा। देशज कुक्कुटों ने 1.95 दिन पूर्व ही परिपक्वता प्राप्त किए और दहलम रेड पठोरों ने पिछली पीढ़ी की तुलना में 1.95 दिन में परिपक्व हुए। देशज जीवियों में 52 सप्ताह तक अंडे का वजन और अंडा उत्पादन क्रमश: 39.25 ग्राम और 66.85 अंडे रहा। दहलम रेड के अंडा उत्पादन में 2 अंडों का सुधार हुआ। बीएन संकर में पांच सप्ताह का शरीर वजन 260.2 ग्राम और एफसीआर 3.15 रहा। कामरूप में यौन परिपक्वता की आयु खुले आंगन एवं क्षेत्र स्थितियों में क्रमश: 151.3 और 171.1 दिन रहा। 40 से 52 सप्ताह तक खुले आंगन एवं क्षेत्रों में अंडे का उत्पादन क्रमश:48.30 और 88.90 अंडे रहा। क्षेत्र में इसका सहसंबंधित मूल्य 42.80 और 72.90 अंडे रहा। केंद्र ने किसानों को 28057 जर्मप्लाज्म की आपूर्ति की। केंद्र को चालू वित्त वर्ष के दौरान रू.7.41 लाख राजस्व प्राप्त हुआ जो दाना पर लागत व्यय का 58.3 9% (12.69 लाख रुपये) है।

रांची केंद्र ने 52 सप्ताह की देशज जीवियों के जी-6 वीं पीढ़ी का मूल्यांकन किया। ई-6 के मूल्यांकन के दौरान 64 सप्ताह तक डीबीएन संकर (झारसिम) का मूल्यांकन किया गया। वर्तमान वर्ष के दौरान देशज एवं डीबीएन क्रॉस (झारसीम) में उर्वरता क्रमश: 86.93% और में 94.54% रिकार्ड की गयी। देशज जीवियों में प्रजनन क्षमता में सुधार हुआ। देशज एवं डीबीएन संकर (झारसीम) में कुल रखे गए अंडों पर सेननता क्रमश: 78.35 एवं 83.08% रहा और डीबीएन संकर (झारसीम) में यह मामूली रूप से सुधार हुआ। 52 सप्ताह की आयु तक कुक्कुट गृहों में देशज कुक्कुटों (जी-6) में अंडे का उत्पादन 52.89 अंडे रहा, इसमें मामूली गिरावट हुई है। बीएन संकर (ई-6) में कुक्कुट गृहों में 64 सप्ताह तक अंडा उत्पादन 92.73 अंडे रहा। फार्म परिस्थितियों में ई-6 में 64 सप्ताह की आयु तक अंडे का उत्पादन बीएनडी क्रॉस (87.2 अंडे) से डीबीएन (झारसीम) क्रॉस (131.4 अंडे) में अधिक

रहा। केंद्र ने किसानों को 21235 जर्मप्लाज्म की आपूर्ति की। केंद्र ने रु. 9.70 लाख राजस्व अर्जित किया, जो दाना लागत (15 लाख) पर व्यय का 64.66% है।

पालमपुर केंद्र ने पहाड़ी इलाकों में खुले आंगन में कुक्कुट पालन के लिए उपयुक्त विशिष्ट दोहरे उद्देश्य के कुक्कुट किस्म हिमसमृद्धि को जारी किया। यह केंद्र अब किसानों के बीच प्रसिद्ध विविधतापूर्व नस्लों के प्रचार-प्रसार पर ध्यान केंद्रित कर रहा है। देशज जर्मप्लाज्म (जी-5) का 55 सप्ताह तक मूल्यांकन किया गया, जिसमें प्रति दिन कुक्कुट के आधार पर अंडा उत्पादन 44.75 और 84.58 अंडे रहा। दहलम रेड (जी-4) में 72 सप्ताहों तक कुक्कुट-गृहों प्रति दिन कुक्कुट एवं उत्तरजीवियों में अंडा उत्पादन क्रमशः 141.9, 175.0 और 215.9 अंडे दर्ज किया गया। हिमसमृद्धि कुक्कुट 72 सप्ताह तक फार्म परिस्थितियों में मूल्यांकन पूरा कर चुके हैं जहां इनका 40, 52 और 72 सप्ताह की आयु तक अंडा उत्पादन क्रमश: 58.9 4, 90.85, 153.99 अंडे रहा, जो पिछले पुश्त की तुलना में 5.42 अंडों का सुधार हुआ। 28 और 40 सप्ताह की आयु में अंडे का औसत वजन क्रमशः 50.85±0.25 और 53.66±0.23 ग्राम रहा। किसानों के स्तर पर, 52 सप्ताह तक हिमसमृद्धि कुक्कुटों में एचएचईपी और एचडीईपी क्रमश: 81.62 और 96.98 अंडे रहा। केंद्र ने किसानों (316 कृषि इकाइयों) को हिमसमृद्धि, देशज और अन्य संकरों के कुल 29617 चूज़ों की आपूर्ति की और रु.11.13 लाख राजस्व प्राप्त किया जो दाना पर व्यय लागत का 59.42% (18.73 लाख रुपये) है।

उदयपुर केंद्र ने 52 सप्ताह तक मेवाड़ी की जी-7 वीं पीढ़ी का मूल्यांकन किया। प्रतापधन को 21 से 72 सप्ताह तक ई-6 और ई-7 के दौरान मूल्यांकन किया गया जिसे 20 सप्ताह तक उत्पादन एवं मूल्यांकन किया गया। सभी जीवियों में प्रजनन क्षमता 78.44 - 92.97% के बीच रही। इस वर्ष के दौरान सभी जीवियों में कुल अंडों और उपजाऊ अंडों में प्रजनन क्षमता और सेननता में वृद्धि हुई है। मेवाड़ी नस्ल में जी-7 वीं पीढ़ी के दौरान 8 सप्ताह में किशोर दशा के शरीर के वजन में मामूली कमी हुई। यद्यपि, जी-7 वीं पीढ़ी में 20 सप्ताह और 40 सप्ताह में शरीर के वजन में 109 और 196 ग्राम की वृद्धि हुई। पिछले पुश्त (जी-6) की तुलना में यौन परिपक्वता की आयु 12.3 दिन तक घट गई। 52 सप्ताह की आयु तक कुक्कुट गृह अंडा उत्पादन में 1.62 अंडों की कमी हुई, जबकि प्रति दिन कुक्कुट के आधार पर उत्पादन में 2.27 अंडों की वृद्धि हुई। कुक्कुट गृह, प्रति दिन कुक्कुट एवं उत्तरजीविता में प्रतापधन में 40 सप्ताह तक अंडे के उत्पादन ई-6 में 15.69, 13 और 50.06 अंडों की कमी हुई। ई-6 में 72 सप्ताह की आयु तक प्रति दिन कुक्कुट के आधार पर अंडा उत्पादन में 3.39 अंडे कम हुआ जबकि कुक्कुट गृह अंडा उत्पादन में 3.91 अंडों की वृद्धि हुई है। 8 सप्ताह की आयु में प्रतापधान का शरीर का वजन 316 ग्राम बढ़ा है। चालू वर्ष के दौरान कुल 83471 जर्मप्लाज्म की आपूर्ति की गई। केंद्र को चालू वित्त वर्ष के दौरान रू.20.33 लाख राजस्व प्राप्त हुआ।

वर्ष 2017-18 के दौरान आपूर्ति किए गए जर्मप्लाज्म एवं राजस्व प्राप्त का विवरण

केंद्र	जर्मप्लाज्म	राजस्व (रू.लाख)
केरल पशु चिकित्सा एवं पशु विज्ञान विश्व विद्यालय, मन्नुति	216397	53.43
आनंद कृषि विश्वविद्यालय, आनंद	49036	18.41
कर्नाटक पशु चिकित्सा, पशु एवं मत्स्य विज्ञान विश्वविद्यालय, बेंगलूरू	210086	54.98
गुरू अंगद देव पशु चिकित्सा एवं पशु विज्ञान विश्वविद्यालय, लुधियाणा	68829	16.96
उडिशा कृषि एवं प्रौद्योगिकी विश्वविद्यालय, भुवनेश्वर	31685	8.76
केंद्रिय पक्षि अनुसंधान संस्थान, इज्ज़तनगर	43084	35.00
महाराणा प्रताप कृषि एवं प्रौद्योगिकी विश्वविद्यालय, उदयपूर	83471	20.33
नानाजी देशमुख पशु चिकित्सा विज्ञान विश्वविद्यालय, जबलपूर	51851	14.46
असम कृषि विश्वविद्यालय, गुवाहाटी	28057	7.41
सीएसके हिमाचल प्रदेश कृषि विश्वविद्यालय, पालमपूर	29617	11.13
बिरसा कृषि विश्वविद्यालय, रांची	21235	9.70
भाकृअनुप एनईएच क्षेत्र अनुसंधान कांप्लेक्स, अगरताला	20913	10.54
कुल	854261	261.11

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 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। दो केंद्रों जैसे छत्तीसगढ़ कामधेनु विश्व विद्यालय, दुर्ग, भाकृअनुप -आईवीआरआई क्षेत्रीय स्टेशन, मुक्तेश्वर को प्रदर्शन अच्छा न होने के कारण 2017-18 से बंद कर दिया गया।

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 (2017-18) 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 631543 सुधारित कुक्कुट किस्मों को वितरित किया गया, जिससे यह केंद्र कुल रु. 176.71 लाख राजस्व प्राप्त किया।

कोलकाता केंद्र ने इस वर्ष के दौरान वनराजा पेरेंटों के छह बैचों की देखभाल की, जिनमें से चार लेइंग में हैं, एक बढ़ रहा है और एक ब्रूडिंग चरण में है। 50% के अंडा उत्पादन को 32 सप्ताह में हासिल किया गया और इसे 64 सप्ताह की आयु तक बनाए रखा गया। प्रजनन क्षमता 60.3% से 90.8% तक रही। पूरे जीवन चक्र में कुल रखे गए अंडे (टीईएस) और उपजाऊ अंडे सेट (एफईएस) पर हेचबिलिटी क्रमश: 78.5% (टीईएस) और 87.1% (एफईएस) रही। वर्ष 2017-18 के दौरान पश्चिम बंगाल के विभिन्न हिस्सों में किसानों को कुल 79,390 वनराजा चूज़ों को वितरित किया गया जिससे कुल राजस्व 11.02 लाख रुपये प्राप्त किए गए।

पटना केंद्र में गहरे लिट्टर के नीचे वनराजा पेरेंटों के तीन बैचों का पालन किया गया। वनराजा मादा पेरेंटों के तीन बैचों की यौन परिपक्वता की औसत आयु 172 दिन रही। 40 सप्ताह की आयु में वनराजा में एचडीईपी 51.56 ग्राम के अंडे के वजन के साथ 51.27% रही। 72% की चोटी का उत्पादन 42 सप्ताह में प्राप्त हुआ। औसत प्रजनन प्रतिशत 86.58 रहा और वनाराजा मादा वंशावलि में टीईएस और एफईएस पर औसत हैचबेलिटी क्रमश: 67.06% एवं 85.54% रही। वर्ष 2017-18 के दौरान बिहार के किसानों को कुल 60,008 वनराजा कुक्कुट जर्मप्लाज्म वितरित किया गया जिससे रु.10.43 लाख राजस्व प्राप्त हुआ।

झरनापनी केंद्र में वनराजा एवं श्रीनिधि के चार बैचों में कुल 2250 पेरेंट मौजूद थे। वनराजा एवं श्रीनिधि के पेरेंटों में 50% का उत्पादन 36 सप्ताह की आयु में प्राप्त हुआ। वनराजा एवं श्रीनिधि मादा वंशावलियों में कुल प्रजनन दर क्रमश: 89.3 एवं 88.08 रहा। वनराजा एवं श्रीनिधि के पेरेंटों के कुल रखे गए उपजाऊ अंडों पर सेननता क्रमश: 81% और 77% रही। वर्ष 2017-18 के दौरान नागालैंड और पड़ोसी राज्यों के किसानों को कुल 136828 सुधार किया गया कुक्कुट जर्मप्लाज्म वितरित किया गया। झरनापानी के इस पीएसपी केंद्र से 57.42 लाख राजस्व प्राप्त हुआ। केंद्र ने जर्मप्लाज्म का लक्ष्य हासिल किया।

भाकृअनुप, एनओएफआरआई, गैंगटॉक, सिक्किम में वनराजा पेरेंटों के दो बैचों का पालन किया गया। इस वर्ष के दौरान वनराजा में औसत एचडीईपी 50 (24-72 सप्ताह) रही। 31-34 सप्ताह की आयु में उच्चतम उत्पादन (70%) प्राप्त किया गया। वनराजा मादा वंशावलि में औसत प्रजनन क्षमता और हेचबिलिटी (टीईएस) दरें क्रमश: 85.58 और 80.42% रही। सिक्किम राज्य के 917 गांवों के आवासों में 3360 किसानों को वनराजा के कुल 94800 सुधार किए गए कुक्कुट जर्मप्लाज्म वितरित किया गया, जिससे केंद्र ने रु. 38.81 लाख राजस्व प्राप्त किया तथा जर्मप्लाज्म के निर्धारित लक्ष्य को प्राप्त किया।

इस वर्ष के दौरान मणिपुर केंद्र में वनराजा और श्रीनिधि पेरेंटों के तीन बैचों का पालन किया गया। वनराजा में औसत एचडीईपी 39% (28-72 सप्ताह) और श्रीनिधि पेरेंटों में 46% (24-72 सप्ताह) रहा। 45 सप्ताह की आयु में उच्च्तम उत्पादन (58%)

प्राप्त किया गया। वनराजा एवं श्रीनिधि पेरेंटों में औसतन प्रजनन क्षमता क्रमश: 84.02 और 84.96% रही। वनराजा एवं श्रीनिधि के पेरेंटों में टीईएस पर सेननता क्रमश: 65.47% और 68.39% रही। मणिपुर के किसानों को कुल 75126 सुधार किया गया कुक्कुट जर्मप्लाज्म वितरित किया गया। केंद्र ने वर्ष 2017-18 के दौरान रू. 20.26 लाख राजस्व प्राप्त किया।

रिपोर्टिंग अवधि के दौरान होसूर केंद्र में वनराज और ग्रामप्रिया पेरेंटों के दो बैचों का पालन किया गया। वनराजा में औसत अंडे का उत्पादन 67% (32-78 सप्ताह) और ग्रामप्रिया में 69% (28-74 सप्ताह) रहा। वनराजा में उच्चतम उत्पादन 80.4% (37 वें सप्ताह) और ग्रामप्रिया में 88% (28 वें सप्ताह) रहा। वनराजा एवं ग्रामप्रिया में औसतन प्रजनन क्षमता क्रमश: 79.06 (26-78 सप्ताह) और 77.71% (25-72 सप्ताह) रही। कुल 126870 (102185 एक दिन की आयु के अंडे और 24685 उपजाऊ अंडे) अंडों एवं विकसित ग्रामीण कुक्कुटों जर्मप्लाज्म (वनराजा और ग्रामप्रिया) को तमिलनाडु में 843 किसानों को वितरित किया गया। केंद्र ने इस वर्ष के दौरान कुल राजस्व रु.25.70 लाख प्राप्त किया तथा लक्ष्य जर्मप्लाज्म की आपूर्ति प्राप्त की।

इस वर्ष के दौरान गोवा में ग्रामप्रिया और श्रीनिधि पेरेंटों के प्रत्येक बैच का पालन किया गया। अंडा उत्पादन 7.67 से 38.8% तक रहा जो लगातार स्थिर नहीं रहा। प्रजनन क्षमता क्रमश: 46.44 से 94.57% और 51.53 से 91.47% तक पहुंच गई। कुक्कुट घर निर्माण कार्य पूरा हुआ। वर्ष 2017-18 के दौरान गोवा के किसानों को कुल 3749 सुधार किया हुआ कुक्कुट जर्मप्लाज्म वितरित किया गया।

वनराजा के दो बैचों और ग्रामप्रिया पेरेंटों के एक बैच को पोर्टब्लेयर में गहरी लिट्टर प्रणाली के तहत रखा गया। ग्रामप्रिया मादा वंशावलि में यौन परिपक्वता (एएसएम) की आयु 170 दिन रही। पूरे बिछाने के चक्र में 35-38 सप्ताह की आयु में उच्चतम अंडे का उत्पादन (38%) दर्ज किया गया। अंडमान और निकोबार द्वीप समूह में 170 किसानों को कुल 10759 सुधारित कुक्कुट जर्मप्लाज्म वितरित किया गया तथा वर्ष के दौरान 1.96 लाख राजस्व प्राप्त हुआ।

एसकेयूएएसटी, श्रीनगर में कुक्कुट घरों और हैचरी का निर्माण पूरा हुआ है। वर्ष 2017-18 के दौरान वनराजा प्रजनकों के दो बैचों का पालन किया गया। 56 सप्ताह से 72 सप्ताह के बीच औसत अंडे का उत्पादन 60% (59-62%) से ऊपर रहा। वनराजा पेरेंटों में कुल रखे गए अंडों पर हैचबिलिटी 27.09 से 76.04% तक रही। जम्मू-कश्मीर के किसानों को कुल 21401 वनराजा चूज़े वितरित किए गए।

वनराजा एवं श्रीनिधि पेरेंटों के दो बैचों को भाकृअनुप एनईएच क्षेत्र, उमियम, बारापानी में पाला गया। 36 सप्ताह की आयु में वनराजा एवं श्रीनिधि के पेरेंटों में एचडीईपी क्रमश: 43% और 28% रही। वनराजा एवं श्रीनिधि के पेरेंटों में प्रजनन क्षमता और हेचबिलिटी (टीईएस पर) क्रमश: 76-83% और 49-75% एवं 71-79% और 50-62% रही। वर्ष 2017-18 के दौरान कुल 22612 कुक्कुट जर्मप्लाज्म को मेघालय के किसानों में वितरित किया गया तथा 11.11 लाख राजस्व प्राप्त किया गया।

खुले घर आंगन में कुक्कुट पालन को लोकप्रिय बनाने के लिए एसवीवीयू, तिरुपति, आंध्र प्रदेश और पीवीएनआर टीवीयू, वारंगल, तेलंगाना में दो नए केंद्रों को वर्ष 2017-18 से जोडा गया है । दो केंद्र क्रमशः 1 फरवरी और 22 मार्च 2018 को आरंभ किए गए। दोनों केंद्रों ने मौजूदा सुविधाओं में पेरेंटों की देखभाल आरंभ की है।

कुक्कुट बीज परियोजना के तहत जर्मप्लाज्म का केंद्रवार वितरण

क्रम सं	केंद्र	जर्मप्लाज्म	राजस्व रू. लाखों में
1	पश्चिम बंगाल पशु एवं मत्स विज्ञान विश्वविद्यालय, कोलकाता	79390	11.02
2	बिहार पशु विज्ञान विश्वविद्यालय, पटना	60008	10.43
3	भाकृअनुप अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, झरनापानी	136828	57.42
4	भाकृअनुप अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, गैंगटॉक	94800	38.81
5	भाकृअनुप उत्तर पूर्वी पर्वतीय क्षेत्र अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, इंफाल	75126	20.26
6	तमिलनाडु पशु चिकित्सा एवं पशु विज्ञान विश्वविद्यालय, होसूर	126870	25.70
7	भाकृअनुप - केंद्रीय तटीय कृषि अनुसंधान संस्थान,गोवा	3749	-
8	भाकृअनुप - केंद्रीय द्वीप कृषि अनुसंधान संस्थान, पोर्टब्लेयर	10759	1.96
9	शेर ए कश्मीर कृषि विज्ञान एवं प्रौद्योगिकी विश्वविद्यालय, श्रीनगर	21401	-
10	भाकृअनुप उत्तर पूर्वी पर्वतीय क्षेत्र अनुसंधान कांप्लेक्स, क्षेत्रीय केंद्र, उमियाम, बारापानी	22612	11.11
11	पीवीएनआर तेलंगाना पशु चिकित्सा विश्वविद्यालय, वारंगल	-	-
12	श्री वेंकटेश्वरा पशु चिकित्सा विश्वविद्यालय, तिरूपति	-	-
	कुल	**631543**	**176.71**

Executive Summary

All India Coordinated Research Project on Poultry Breeding

AICRP on Poultry Breeding was reoriented towards Rural Poultry during the year 2014-15. At present the project is being operated at twelve centres viz. KVASU, Mannuthy, AAU, Anand, KVAFSU, Bengaluru, GADVASU, Ludhiana, OUAT, Bhubaneswar, CARI, Izatnagar, ICAR Research Complex 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, 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 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 8,54,261 chicken germplasm was distributed to the farmers from different centres with a total revenue generation of Rs. 261.11 lakhs during the year 2017-18.

KVASU, Mannuthy centre has evaluated the S-2 generation of native chicken germplasm up to 40 weeks of age. Egg production of native chicken germplasm up to 40 weeks of age was 75.96 eggs with average egg weight of 42.47 g. Egg production increased by 3.88 eggs and egg weight increased by 0.7 g in the S-2 generation. Good fertility (90.04%) and hatchability (94.27 and 84.89% on FES and TES) was observed in S-3 generation. Age at sexual maturity was 154.2 days in S-3 generation. Farm and field testing of three way cross (NDR) was carried out. Hen housed egg production up to 40 weeks of age of NDR in farm condition was 80.87 eggs and in field condition it was 49.73 eggs. Besides, the centre evaluated IWN and IWP strains up to 40 weeks of age in S-30 generation along with layer control population. In this generation hen housed egg production up to 40 weeks of age decreased by 2.51 eggs in IWN (120.23) whereas it increased by 3.8 eggs in IWP (124.83) strain on phenotypic scale. The centre has generated Rs. 53.84 lakhs revenue, which was 218.15% of the total expenditure on feed (Rs. 24.68 lakhs). The centre has supplied a total of 2,16,397 number germplasm during the year.

At AAU, Anand, birds of S-1 generation of native and RIR breeds and their F_1 and three way crosses were evaluated up to 40 weeks (RIR & Native) and 64 weeks (F_1 & three way cross) of age. Egg production up to 40 weeks of age was higher in native chicken (71.3) as compared to RIR (68.5), while, body weight and egg weight at 40 weeks of age were higher in RIR breed. Chicks of native (S-2), RIR (S-0) and F_1 cross and three way cross were generated. Hatchability was also better in RIR birds (81.35%) as compared to native birds (77.10%). Egg production up to 40 weeks of age was higher in IWN (120.7) than IWP strain (110.4) which has improved over previous generation. The centre has generated the revenue of Rs. 18.41 lakhs which was 71.62% of the expenditure of feed cost (25.62 lakhs). The centre has supplied a total of 49,036 germplasm.

At Bengaluru centre, performance of local chicken germplasm was evaluated. A total of 2238 chicks were housed and body weight at 8, 12 and 20 weeks of age was 477.8, 785.6 and 1110 g, respectively. The average age at sexual maturity was 165.47 days. PB-1 males were crossed with local chicken and 315 chicks were produced. The average eighth week body weight of the F_1 males was 886.9 g and that of females was 768.8 g. The FCR was 2.98. The body weight at day old and 5 weeks of age increased in PB-1 and PB-2 line. The average egg production at 40 weeks of age (survivor basis) in PB-1, PB-2 and Control lines were 57.01, 56.9 and 66.1 eggs, respectively. The average phenotypic and genetic response of body weight at 5 weeks over 11 generations in PB-1 was 14.4 and 24.4g, respectively. Corresponding values in PB-2 at 5 week over 12 generations was 9.25 and 17.08 g, respectively. The average body weights at 6 and 7 weeks of age were 1692 and 2080 g in Raja - II (PB-1 x PB-2) at 47th RSPPT, Gurgaon. The feed efficiency

was 1.56 between 0 - 7 weeks. The dressing percentage was 71.5. A total of 2,10,086 germplasm (1,91,922 day old chicks and 18,164 hatching eggs) were supplied to 397 beneficiaries. The centre generated revenue of Rs. 54.98 lakhs which is 168.18% of expenditure on feed cost (Rs. 32.69 lakhs).

At Ludhiana centre, the evaluation of local native chicken germplasm was carriedout and a total of 1435 good chicks of local native chicken were hatched. The body weight of native germplasm at day one, 4 and 8 week of age were 38.47, 572.1, 737.9 g. The body weight of PB-2 x Desi at 4 week of was 612.0 g in farm and 359.1 g in field. Egg production up to 40 weeks of PB-2 X Local was 77.2 eggs. Average body weight at 5 weeks of age was 1200, 934.4 and 871.3 g in PB-1, PB-2 and Control lines, respectively. The body weight at 5 weeks of age increased in PB-1 line and decreased in PB-2 and control lines as compared to previous generation. Genetic response over last 11 generations for 5 week body weight was 22.09 g in PB-1 and 11.9g in PB-2 population. A total of 68,829 germplasm (64,413 day old chicks and 4,416 adult birds) were supplied to 170 beneficiaries. The centre generated revenue of Rs. 16.96 lakhs which is 105.33% of expenditure on feed cost (Rs.16.10 lakhs).

CARI centre evaluated the local native chicken germplasm and 744 good chicks were produced. The body weight of local native chicken at day old, 2, 4 and 6 weeks were 38.4, 124, 291.03 and 543.9 g, respectively, The mortality up to 5 weeks was 3.45 % and 6-20 weeks period was 9.79 % in desi chicken. The Desi X Desi and Desi X CSML crosses were obtained and different parameters were recorded. A total of 1180 and 1170 good chicks of CSML and CSFL was produced during first hatch. The body weight of CSML x Desi chicks at day old, 2, 4 and 6 weeks were 35.86, 152.7, 420.4 and 794.1 g, respectively. The body weight at 5 week increased in CSML and CSFL. The FCR at 5 weeks of age in CSML, CSFL and Control was 2.12, 2.02 and 2.25, respectively. The 40 week egg production increased in CSML as compared to previous generation. The phenotypic response of 5 weeks body weight per generation was 15.96 and 15.85 g in CSML and CSFL, respectively. The genetic response was 14.34 and 14.19 g, respectively. A total of 43,084 germplasm (11,795 Fertile eggs and 31,289 DOCs) were supplied to 22 beneficiaries including farmers & entrepreneurs, AH deptt, KVKs, etc. belonging to 6 states. Revenue generation was Rs. 35 lakhs.

At Bhubaneswar centre Native *Hansli* chicken population has been registered with ICAR-NBAGR with Accession Number INDIA_CHICKEN_1500_ *HANSLI*_12018. A total of 1148 good chicks of *Hansli* were produced. The fertility was 84.05% in *Hansli* and the hatchability on TES and FES basis were 74.17 and 88.31%, respectively. The average body weight at day one and 8 week of native chicken was 30.29 and 556.5 g. The egg production up to 40 weeks in *Hansli* was 20.18. The evaluation of CSML X *Hansli* and *Hansli* X CSML crosses is in progress. Body weight at day old and at 5 weeks of age in CSML X *Hansli* was 30.44 and 548.8 g, respectively. Corresponding body weights of *Hansli* X CSML was 40.20 and 566.2 g, respectively. The mortality during 0-5 weeks in CSFL and CSML line was 4.52 and 4.84%, respectively. In the current year the body weight at 5 weeks remained static in CSFL and CSML. EP 40 and EP 52 has increased in both CSFL and CSML lines. The mean 7th week body weight, FCR and mortality were 2152 g, 2.12 and 0.67% respectively in the field. Centre has supplied 31,685 day old chicks to farmers. The centre has generated revenue of Rs. 8.76 lakhs, which is 50.78 percent of total feed cost.

Tripura centre evaluated Tripura Black, *Dahlem Red*, broiler dam line, and BN cross. Three way cross was evaluated in E-2 generation. Performance of dual variety chicken (BND Cross) is evaluated at institute farm as well as the farmer's field. The hatchability on total eggs set improved in all the lines as compared to previous generation. The mortality during brooding period was lowest in Tripura black (4.30%) and *Dahlem Red* populations (4.70%). The body weight at 8 weeks was 316.4, 544.2, 1044 and 550.1 g in Tripura Black, *Dahlem Red*, Coloured broiler dam line and BN cross, respectively. The 20 week body weight was 1105, 1720, 3240 and 1590 g in Tripura Black, *Dahlem Red*, Coloured broiler dam line and BN cross, respectively. During E-2 evaluation the 72 week egg production was 141 and 119 eggs under farm and field conditions, respectively in BND cross. A total of 20,913 germplasm (20,913 chicks) were supplied to 501 beneficiaries during 2017-18. The centre generated revenue of Rs. 10.54 lakhs which is 48.88 % of expenditure on feed cost (Rs. 21.56 lakhs).

Jabalpur centre evaluated G-8 generation of *Kadaknath* and Jabalpur colour 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 397 and 827g in *Kadaknath* and Jabalpur colour population, respectively. The egg weight at 40 weeks of age was 58.7g in Jabalpur colour and 47.8 g in *Kadaknath*, respectively. The hen housed egg production up to 40 weeks of age was 88.9

eggs in JBC and 54.6 eggs in *Kadaknath*. In CSFL 40 week egg weight and production were 60.1 g and 62.0 eggs, respectively. *Narmadanidhi*, produced 66 eggs up to 40 weeks of age in farm conditions. It produced 44, 85.2 and 168 eggs up to 40, 52 and 72 weeks, respectively in field conditions. The egg production reduced both at farm and field conditions. A total of 51,851 germplasm (20,796 chicks, growers, pullets and 31,055 hatching eggs) were supplied to 217 beneficiaries. The centre generated revenue of Rs. 14.46 lakhs which is 73.5% of expenditure on feed cost (19.97 lakhs).

Guwahati centre evaluated native, *Dahlem Red*, PB-2 and BN populations up to 52 weeks of age. *Kamrupa* was evaluated up to 52 weeks of age under farm and field conditions. The average fertility of all the flocks was found to be 87.67%. The mortality during brooding and growing period was below 9.96% in all the lines. The 5 week body weight was 126.6 g in indigenous, 1035g in PB-2 and 350.2g in *Dahlem Red*. Indigenous birds matured early by 1.95 days and *Dahlem Red* pullets matured late by 1.95 days compared to previous generation. In native population the egg weight and egg production up to 52 weeks was 39.25g and 66.85 eggs, respectively. In *Dahlem Red* egg production improved by 2 eggs. The five weeks body weight was 260.2 g and FCR was 3.15 in BN cross. The age at sexual maturity was 151.3 days in the farm and 171.1 days in the field in *Kamrupa*. The hen housed egg production up to 40 and 52 weeks of age was 48.30 and 88.90 eggs in the farm and corresponding values in the field were 42.80 and 72.90 eggs, respectively. The centre supplied 28,057 germplasm to farmers. The centre realized receipt of Rs. 7.41 lakhs during the current financial year which is 58.39% of expenditure on feed cost (Rs.12.69 lakhs).

Ranchi centre evaluated G6 generation of native population up to 52 weeks of age. DBN cross (*Jharsim*) was evaluated up to 64 weeks during E6 evaluation. The fertility recorded was 86.93% in native and 94.54% in DBN cross (*Jharsim*) during current year. The fertility has improved in native population. The hatchability on total eggs set recorded was 78.35 in native and 83.08% in DBN cross (*Jharsim*) and it improved marginally in DBN cross (*Jharsim*). The hen housed egg production up to 52 weeks was 52.89 eggs in native population (G-6) and it declined marginally. In BN cross (E6) hen housed egg production up to 64 weeks of age was 92.73 eggs. The hen day egg production in E6 up to 64 weeks of age was more in DBN *(Jharsim)* cross (131.4 eggs) than BND cross (87.2 eggs) during E5 evaluation under farm conditions. Centre supplied 21,235 germplasm to the farmers. The centre generated revenue of Rs. 9.70 lakhs which is 64.66% of expenditure on feed cost (15 lakhs).

Palampur centre released the location specific dual purpose chicken variety *Himsamridhi* suitable for backyard poultry farming in hilly areas. The centre is now focusing on propagation of the developed variety among farmers. The native germplasm (G-5) was evaluated up to 52 weeks of age with hen-day egg production of 84.58 eggs. In *Dahlem Red* (G-4) the 72 weeks hen-housed, hen-day and survivors' egg production recorded was 141.9 175.0 and 215.9 eggs, respectively. *Himsamridhi* birds completed 72 weeks on-farm evaluation with hen housed egg production of 58.94, 90.85, 153.99 eggs up to 40, 52 and 72 weeks of age showing improvement over previous year. The average egg weight at 28 and 40 weeks of age was 50.85±0.25 and 53.66±0.23 g respectively. The 52 weeks HHEP and HDEP of *Himsamridhi* birds were 81.62 and 96.98 eggs, respectively under field condition. The centre supplied 29,617 chicks of *Himsamridhi*, Native and other crosses to farmers (316 farm units) and realized receipt of Rs. 11.13 lakhs which is 59.42% of expenditure on feed (Rs.18.73 lakhs).

Udaipur centre evaluated G-7 generation of *Mewari* breed up to 52 weeks. *Pratapdhan* was evaluated from 21 to 72 weeks (E-6) and up to 20 weeks of age (E-7). The fertility ranged from 78.44 – 92.97% in all the populations. The fertility and hatchability on total eggs and fertile eggs set in all populations increased in this year. In *Mewari* breed the juvenile body weights at 8 weeks marginally reduced during G-7 generation. However, 20 weeks and 40 weeks body weight increased by 109g and 196g in G-7 generation. The age at sexual maturity has decreased by 12.3 days as compared to previous (G-6) generation. The hen housed egg production up to 52 weeks of age decreased by 1.62 eggs while hen day egg production increased by 2.27 eggs. Hen housed, hen day and survivors egg production up to 40 weeks of age of *Pratapdhan* decreased by 15.69, 13 and 50.06 eggs in E-6. The hen day egg production up to 72 weeks of age decreased by 3.39 eggs while hen housed egg production increased by 3.91 eggs in E-6 generation. Body weight of *Pratapdhan* at 8 weeks of age increased by 316g. A total of 83,471 germplasm was supplied during the current year. The centre realized a receipt of Rs. 20.33 lakhs during the current financial year.

Germplasm supply and revenue generation during 2017-18

Centre	Germplasm	Revenue (Rs. in Lakhs)
KAVSU, Mannuthy	2,16,397	53.43
AAU, Anand	49,036	18.41
KVAFSU, Bengaluru	2,10,086	54.98
GADVASU, Ludhiana	68,829	16.96
OUAT, Bhubaneswar	31,685	8.76
ICAR-CARI, Izatnagar	43,084	35.00
MPUAT, Udaipur	83,471	20.33
NDVSU, Jabalpur	51,851	14.46
AAU, Guwahati	28,057	7.41
CSKHPKVV, Palampur	29,617	11.13
BAU, Ranchi	21,235	9.70
ICAR-RC, Agartala	20,913	10.54
Total	**8,54,261**	**261.11**

Poultry Seed Project

"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. In addition, one non funding centre is also functioning. 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. The project was further strengthened with addition of three more centres viz., PVNR Telanagna Veterinary University, Warangal; Sri Venkateswara Veterinary University, Tirupatui and ICAR Research Complex for NEH Region, Umiam. Two centres viz., Chhattisgarh Kamadhenu Viswa Vidyalaya, Durg and ICAR-IVRI Regional Station, Mukteswar were discontinued from 2017-18 due to the non performance.

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 under report (2017-18) were between 0.3 and 1.0 lakh chicks per annum for different centres and to collect feedback on the performance of the germplasm under backyard free range conditions. A total of 6,31,543 improved chicken varieties have been distributed in their respective regions/states during the year. A total of Rs. 176.71 lakhs revenue generated from the Poultry Seed Project.

Six batches of *Vanaraja* parents were reared during the year at Kolkata centre, out of which, four are in laying, one in growing and one in brooding phase. The egg production of 50% was achieved at 32 weeks and maintained up to 64 weeks. Fertility ranged from 60.3% to 90.8%. Hatchability on total eggs set (TES) and fertile eggs set (FES) was consistent throughout the life cycle reaching up to 78.5% (TES) and 87.1% (FES). A total of 79,390 *Vanaraja* chicks were distributed to the farmers in various parts of West Bengal during the year 2017-18. The total revenue generated was Rs.11.02 lakhs.

Three batches of *Vanaraja* parents were reared under deep litter at Patna Centre. The average age at sexual maturity of three batches was 172 days in *Vanaraja* female parents. The HDEP in *Vanaraja* at 40 weeks of age was 51.27% with an egg weight of 51.56g The peak production of 72% attained at 42 weeks. The average fertility was 86.58% and the average hatchability on TES and FES were 67.06% and 85.54%, respectively in *Vanaraja* female line. A total of 60,008 *Vanaraja* chicken germplasm was distributed to the farmers in Bihar during the year 2017-18 with an amount of Rs. 10.43 lakhs revenue.

A total of 2250 parents of *Vanaraja* and *Srinidhi* were in position at present in four batches at Jharnapani centre. The production of 50% was attained at 36 weeks of age in both *Vanaraja* and *Srinidhi* parents. The overall fertility rate was 89.3 and 88.08% in *Vanaraja* and *Srinidhi* female lines respectively. The hatchability on fertile eggs set was 81% in *Vanaraja* and 77%, in *Srinidhi* parents, respectively. A total of

1,36,828 improved chicken germplasm was distributed to farmers of Nagaland and neighbouring states during the year 2017-18. A total of Rs. 57.42 lakhs revenue was generated under PSP 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 50 (24-72 weeks) during the year. Peak production (70%) was attained at 31-34 weeks of age. The average fertility and hatchability (TES) rates in *Vanaraja* female line were 85.58 and 80.42%, respectively. A total of 94,800 improved chicken germplasm of *Vanaraja* was distributed to 3360 farmers covering 917 village habitats in Sikkim with an amount of Rs.38.81 lakhs revenue. The centre achieved the set target of germplasm.

Three batches of *Vanaraja* and *Srinidhi* parents were reared at Manipur Centre during the year. The average HDEP was 39% (28-72 weeks) in *Vanaraja* and 46% (24-72 wks) in *Srinidhi* parents. Peak production (58%) was attained at 45 weeks of age. The average fertility was 84.02 and 84.96% in *Vanaraja* and *Srinidhi* parents, respectively. The hatchability on TES was 65.47% in *Vanaraja* and 68.39% in *Srinidhi* parents. A total 75,126 improved chicken germplasm was distributed to the farmers in Manipur. The Centre has generated Rs. 20.26 lakhs of revenue during the year 2017-18. The centre achieved the target of germplasm supply.

Two batches of *Vanaraja* and *Gramapriya* parents were reared at Hosur Centre during the reporting period. The average egg production was 67% (32-78 weeks) in *Vanaraja* and 69% (28-74 weeks) in *Gramapriya*, respectively. The peak production was 80.4% (37 wks) in *Vanaraja* and 88% (28 wks) in *Gramapriya*. The average fertility was 79.06 (26-78 wks) in *Vanaraja* and 77.71% (25-72 wks) in *Gramapriya*, respectively. A total of 1,26,870 (1,02,185 DOC and 24,685 fertile eggs) improved rural chicken (*Vanaraja* and *Gramapriya*) germplasm was distributed to 843 farmers in Tamil Nadu. The Centre has generated total revenue of Rs. 25.70 lakhs during the year. The centre has achieved the target germplasm supply.

One batch each of *Gramapriya* and *Srinidhi* parents were reared at Goa centre during the year. The egg production ranged from 7.67 to 38.8%, which was not consistent. The fertility ranged from 46.44 to 94.57% and hatchability from 51.53 to 91.47%, respectively. The construction poultry houses completed. A total of 3,749 improved chicken germplasm was distributed to the farmers of Goa during the year 2017-18.

Two batches of *Vanaraja* and one batch of *Gramapriya* parents were reared under deep litter system at Port Blair centre. The age at sexual maturity (ASM) was 170 days in *Gramapriya* female line. The highest egg production (38%) was recorded at 35-38 weeks of age in the entire laying cycle. A total 10,759 improved chicken germplasm were distributed to 170 farmers in Andaman & Nicobar Islands with revenue of Rs. 1.96 lakhs during the year.

The construction of poultry houses and hatchery was completed at SKUAST, Srinagar. Two batches of *Vanaraja* parents were reared during the year 2017-18. The average egg production was above 60% (59-62%) from 56 weeks to 72 weeks of age. The hatchability on total egg set ranged from 27.09 to 76.04% in *Vanaraja* parents. A total of 21,401 *Vanaraja* chicks were distributed to farmers in Jammu and Kashmir.

Two batches of *Vanaraja* and *Srinidhi* parents reared at ICAR RC for NEH Region, Umiam, Barapani. The HDEP at 36 weeks of age was 43% in *Vanaraja* and 28% in *Srinidhi* parents. The fertility and hatchability (TES) ranged from 76-83% and 49-75% in *Vanaraja* and 71-79% and 50-62% in *Srinidhi* parents, respectively. A total 22,612 improved chicken germplasm was distributed to the farmers in Meghalaya with an amount of Rs. 11.11 lakhs of revenue during the year 2017-18.

Two new centres one at SVVU, Tirupati, Andhra Pradesh and the other at PVNR TVU, Warangal, Telangana were added from 2017-18 to popularize the backyard poultry in respective regions. The two centres were launched on 1st February and 22 March 2018, respectively. Both the centres initiated the parent rearing in the existing facilities.

Centre wise distribution of germplasm under PSP

Centre	Germplasm	Revenue Rs. in lakhs
WBUAFS, Kolkata	79,390	11.02
BASU, Patna	60,008	10.43
ICAR-RC, Jharnapani	1,36,828	57.42
ICAR-NOFRI, Gangtok	94,800	38.81
ICAR-RC, Imphal	75,126	20.26
TANUVAS, Hosur	1,26,870	25.70
ICAR-CCARI, Goa	3,749	0
ICAR-CIARI, Port Blair	10,759	1.96
SKUAST, Srinagar	21,401	0
ICAR-RC for NEHR, Umiam	22,612	11.11
PVNRTVU, Waranagal	-	0
SVVU, Tirupati	-	0
Total	**6,31,543**	**176.71**

Budget

AICRP on Poultry Breeding

(Rs. in lakhs)

AICRP Centre	Actual budget released (ICAR share)	Budget for (State share)	Total expenditure incurred	Expenditure on feed	Receipts
KVASU, Mannuthy	50.75	16.93	67.68	24.68	53.53
AAU, Anand	47.75	15.92	63.67	25.62	18.41
OUAT, Bhubaneswar	44.75	14.91	59.66	17.26	8.76
GADVASU, Ludhiana	56.75	18.91	75.66	16.10	16.96
KVAFSU, Bengaluru	55.68	18.56	74.24	32.69	54.98
MPPCVV, Jabalpur	55.75	18.58	74.33	19.97	14.46
NEH, Agartala	32.02	-	32.02	21.56	10.54
AAU, Guwahati	42.75	14.25	57.00	12.69	7.41
CSKHPKV, Palampur	55.90	18.63	74.53	18.73	11.13
BAU, Ranchi	52.90	17.63	70.53	15.0	9.70
MPUAT, Udaipur	49.50	16.49	65.99	-	20.33
CARI, Izatnagar	-	-	-	-	35.00
Total	**544.50**	**170.81**	**715.31**	**204.3**	**261.21**

Poultry Seed Project

(Rs. in lakhs)

Seed centre	SFC (2017-20)	2017-18	Budget released	Receipt if any,
WBUAFS, Kolkata	124.13	43.40	43.40	11.02
BASU, Patna	132.96	45.40	45.40	10.43
ICAR-RC, Jharnapani	167.09	66.90	66.90	57.42
ICAR-NOFRI, Gangtok	158.13	59.90	59.90	38.81
ICAR-RC, Imphal	135.67	45.70	45.70	20.26
TANUVAS, Hosur	117.92	40.72	40.72	25.70
ICAR-CCARI, Goa	107.25	37.85	37.85	--
ICAR-CIARI, Port Blair	107.25	37.50	37.50	1.96
SKUAST, Srinagar	105.42	37.17	37.17	--
ICAR RC for NEHR, Umiam	226.23	41.78	41.78	11.11
PVNRTVU, Warangal	146.26	28.00	28.00	--
SVVU, Tirupati	141.19	27.18	27.18	--
Total	**1669.5**	**511.50**	**511.50**	**176.71**

AICRP on Poultry Breeding

History

The Directorate of Poultry Research (Project Directorate on Poultry) had a modest beginning during the IV five year plan. Indian Council of Agricultural Research sanctioned 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 known as "All India Coordinated Research Project on Poultry Breeding" during the V plan period with no change in objectives. 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. Besides AICRP on Poultry Breeding, Project Directorate also encompassed two more coordinated projects i.e. AICRP on Poultry Nutrition and AICRP on Poultry Housing and Management, which were subsequently phased out during 1992-93.

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. From 1st April, 1990 the Project Directorate had been entrusted with additional responsibilities of maintenance, evaluation, production and supply of control populations of egg and meat to the centres. Maintenance of layer and broiler control previously maintained at HAU, Hissar and UAS, Bengaluru 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-chemic, immunologic 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.

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

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.	ICAR-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 Units

Technical Program

Technical Programme in brief for the year 2017-2018

- 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 5^{th} and 6^{th} 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.

Recommended technical programme for improvement of native chicken given in the proceedings.

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
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

Kerala Veterinary and Animal Sciences University, Mannuthy

Programme activity assigned

- Conservation, characterization and improvement of the native chicken germplasm collected from the field.
- The egg production up to 64 weeks is the selection criterion in IWN and IWP strains.
- The centre will 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 birds of S-2 generation has completed evaluation up to 40 weeks of age.
- S-3 generation of native birds produced by pedigree hatch has completed testing up to 16 weeks of age.
- 622 female birds of IWN strain and 753 female birds of IWP strain in S-30 generation have completed testing up to 40 weeks of age.
- The body weight at 16 and 40 weeks of age was 1081 and 1498g respectively for IWN and 1103 and 1500g respectively for IWP strains in S-30 generation.
- The age sexual maturity was 139.6 and 135.4 days in IWN and IWP respectively. The egg weight at 40 weeks of age was 52.03 and 52.11g respectively in IWN and IWP strains.
- The hen-housed egg number up to 40 weeks of age was 120.23 and 124.83 respectively in IWN in IWP strains. The values of hen-day and survivors' egg production up to 40 weeks of age were 122.85 and 124.47 respectively in IWN and 127.83 and 129.51 respectively in IWP strain in S-30 generation.
- IWN X Native (ND) cross was produced and evaluated up to 72 weeks and chicks of ND male with RIR female (NDR) have been produced and evaluated in farm and field condition up to 40 weeks of age.
- Pedigreed hatching egg of IWN and IWP (2500 nos. each) were supplied to Anand centre.
- Commercial birds of IWN X IWP cross were supplied to farmers and institutions.

Details of the implementation of programme and results achieved

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

Production traits of Native birds

A population of native birds of S-2 generation was evaluated from 33 to 40 weeks of age in the reporting period of 2017-18 and its production performance is presented in Table 1. Hen housed egg production up to 40 weeks of age has improved in this generation by 3.88 numbers (Table 1).

Table 1. Average egg production and egg weights of native birds (S-2 generation)

Traits	N	Mean ±SE
Body weight at 40 wks (g)		
Female	533	1246±7.11
Male	171	2023±7.11
Egg weight at 40 wks (g)	340	42.47±0.23
Hen housed egg production (40 wks) Nos.	607	75.96±0.94
Hen day egg production (17-40 wks) Nos.	-	77.90
Survivors' egg production (17-40 wks) Nos.	545	79.19±0.88

Fertility and hatchability

S-2 generation of native chicken produced by pedigree mating has completed testing up to 40 weeks of age and S-3 generation has completed testing up to 16 weeks of age. The number of sires and dams used for breeding to produce the S-3 generation was 50 and 250 (1:5) respectively. Fertility and hatchability percentage declined in S-3 generation as compared to previous generation (Table 2).

Table 2. Summary of Incubation and Hatching results for S-3 chicks of native chicken

Gens.	No. of hatches	Eggs set (Nos.)	Infertile eggs (Nos.)	Fertility (%)	Total chicks (Nos.)	Dead germ (Nos.)	Good chicks (Nos.)	Hatchability (%)	
								TES	FES
S-1	2	6164	328	94.90	5801	285	5796	90.55	95.39
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**

Growth traits

Results of body weight recorded at various intervals, ASM and egg weight recorded at 28, 32 and 40 weeks of age are presented in Table 3. Body weights at 8 and 16 weeks of age in both male and females reduced in S-3 generation over S-2 generation. Similarly, egg weight at 28 and 32 weeks of age reduced marginally in S-2 generation. However, egg weight at 40 weeks of age increased marginally in S-2 generation over S-1 generation.

Table 3. Mean body weights, ASM and egg weights of native birds (Mean ± SE)

Traits	Females			Males		
	N	S-3	S-2	N	S-3	S-2
Body weight (g)						
0 day	50	31.7 ± 0.37	28.1 ± 0.18	50	32.43 ± 0.40	28.5 ± 0.18
4 wks	205	260 ± 18.9	259 ± 1.5	155	248 ± 21.2	282.4 ± 2.8
8 wks	580	408 ± 3.7	540 ± 2.95	132	504 ± 10.4	667 ± 5.03
16 wks	599	882 ± 4.2	986 ± 15.5	249	1225 ± 9.2	1289 ± 22.2
ASM (d)	461	154.2 ± 0.4	156.77 ± 1.53			
Egg weight (g)						
28 wks	515	-	39.64 ± 0.16	-	-	-
32 wks	501	-	40.78 ± 0.16	-	-	-
40 wks	340	-	42.47 ± 0.23	-	-	-

Mortality in native birds

Less mortality was observed during 0-8, 9-16 and 17-40 weeks of age in S-2 generation. In S-3 generation, mortality was well within the limit during 0-8 and 9-16 weeks of age (Table 4).

Performance evaluation of three way cross (NDR)

During the current year, two way cross (ND) and three way cross (NDR) were produced and evaluated along with RIR (S-0) populations. The results of evaluation are given in Table 5. Field testing of NDR cross was done from 20 weeks of age. Hen housed egg production of NDR cross up to 40 weeks of age in farm condition was 80.87 eggs while it was 48.73 eggs under field condition.

B. Improvement of IWN and IWP strains of White Leghorn

The centre evaluated the IWN and IWP strains for S-30 generation up to 40 weeks of age during the year 2017-2018.

Mortality

The mortality of IWN and IWP birds during 0-8 and 9-16 weeks of age was well within the specified limit of 6% but it slightly exceeded in 17-40 weeks in both population (Table 6).

Egg number

The birds in S-30 generation have completed the performance evaluation up to 40 weeks of age during the period under report (Table 7). The phenotypic response realized in S-30 generation for hen-housed, hen-day and survivors egg production up to 40 weeks of age were -2.5, -0.28 and 1.2 eggs in IWN strain (Response was negative for hen housed and hen day). The respective values for IWP strain were 3.8, 3.7 and 5.2 eggs (Response was positive).

Table 4. Mortality records for native birds S-3 generation

Generation	0-8 wks			9-16 wks			17-40 wks		
	No. Housed	No. Died	Mortality (%)	No. Housed	No. Died	Mortality (%)	No. Housed	No. Died	Mortality (%)
S-1	1774	43	2.42	1500	118	7.87	725	104	14.3
S-2	1596	32	2.00	1449	2	0.14	**817**	**60**	**7.30**
S-3	**1675**	**35**	**2.10**	**1583**	**24**	**1.50**	-	-	-

Table 5. Performance of ND, RIR (S0) and NDR cross at farm and field conditions

Traits	ND (IWN X Native)		RIR (S0)		NDR (ND X RIR)		
	N	Mean ± SE	N	Mean ± SE	N	Farm	Field
Body weight (g)							
0 day	62	30.4±0.95	50	43.02±0.44	362	31.46±0.15	-
4 wks	62	254±3.33	20	174±7.59	354	193±2.26	-
8 wks	62	576±7.45	20	516±16.7	300	470±5.56	-
16 wks	62	1007±28.8	309	1298±8.5			-
20 wks					104	1424±17.7	-
40 wks	40	1500±41.0	244	1870±9.7	78	1585±26.9	1626±37.2
Age at 50 % EP (d)	73	158	-	-	-	-	161
ASM (d)			309	160.9±0.6	96	156.4±1.94	-
Egg weight (g)							
28 wks	56	44.91±0.36	281	51.14±0.23	82	45.81±0.57	48.31±1.17
40 wks	44	47.42±0.41	266	56.83±0.28	65	52.31±0.56	53.±1.00
64 wks	27	51.78±0.79	38	59.49±0.86			
EP up to 40 wks (Nos.)							
Hen housed	73	91.75	305	71.04±0.96	104	80.87±3.80	49.73±1.56
Hen day		95.25		71.25		87.71	55.5
Survivors'		-	293	72.18±0.93	88	92.75±3.00	
HHEP 64 wks	73	183.19	70	139.47±6.05			
HHEP 72 wks	73	200.01	27	176.66±10.94			

Table 6. Mortality percentage at different ages in last three generations

Generations	Strains	0-8 wks	9-16 wks	17-40 wks	17-64 wks
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**	**-**
	IWP	**2.09**	**2.35**	**7.70**	**-**
	Control	**1.20**	**4.40**	**5.40**	**-**

Table 7. Growth and production performances in S-30 generation of IWN and IWP strains and control layer population

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
ASM (d)	619	139.6±0.39	753	135.4±0.46	145	156.2±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
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		122.85		127.83		89.04

Egg weight

The egg weight at 28 weeks of age increased marginally in IWN and IWP strains compared to last generation (Table 8). However, egg weight at 40 weeks of age slightly decreased in IWN and IWP line in the present generation as compared to last generation. In control population there was increase in egg weight at 28 and 40 weeks of age in S-30 generation compared to S-29 generation.

Heritability estimates

The heritability estimates of egg production up to 40 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 in the range of moderate to high in magnitude in both strains (Table 9).

Response to selection

The phenotypic response for age at sexual maturity was negative in IWN and IWP strains. Similarly, phenotypic response for egg weight at 40 weeks of age was negative in both IWN and IWP strains (Table 10). However, phenotypic response for hen housed egg production up to 40 weeks of age was negative in IWN strain and positive in IWP strain.

Table 8. Mean egg weights at various ages in last five generations in different strains

Strains	Gen.	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**	-
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**	-
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	44.40±0.85	51.01±0.47	53.92±0.57
	S-30	**49.05±0.27**	**53.01±0.29**	-

Table 9. Heritability estimates of different traits in IWN & IWP strains in S-30 generation

Strains	Traits	Sire	Dam	Sire + Dam
IWN	ASM	0.075±0.100	0.591±0.196	0.033±0.092
	BW16	0.543±0.185	0.209±0.194	0.376±0.093
	BW40	0.356±0.162	0.926±0.204	0.641±0.104
	EW28	0.184±0.127	0.489±0.203	0.337±0.095
	EW40	0.144±0.128	0.507±0.218	0.325±0.100
	EP40	0..280±0.154	0.097±0.219	0.189±0.093
IWP	ASM	0.168±0.102	0.00±0.00	0.084±0.065
	BW16	0.391±0.150	0.747±0.179	0.569±0.092
	BW40	0.379± 0.148	0.517±0.178	0.448±0.089
	EW28	0.327±0.135	0.076±0.165	0.201±0.075
	EW40	0.455±0.163	0.634±0.182	0.545±0.093
	EP40	0.102±0.092	0.022±0.164	0.062±0.065

Table 10. Phenotypic response in primary and various correlated traits in S-30 generation

Traits	IWN	IWP
ASM (d)	-1.78	-4.45
Body weight (g)		
16 wks	30.11	61.00
40 wks	50.21	14.18
Egg weight (g)		
28 wks	0.78	0.23
40 wks	-0.12	-0.02
Egg number at 40 wks		
Hen Housed	-2.51	3.80
Hen Day	-0.28	3.71
Survivors	1.24	5.18

Genetic Response

The genetic response for hen housed egg production up to 40 weeks of age was negative in IWN and positive in IWP strain in S-30 generation. However, genetic response (indirect) for egg weight and body weight at 40 weeks of age was negative in both strains in this generation (Table 11).

Table 11. Genetic gain in primary and various correlated traits in S-30 generation

Traits	IWN	IWP
Average age at first egg (g)	-3.42	-6.09
Body weight at 16 wks (g)	41.81	72.7
Body weight at 40 wks (g)	-86.83	-122.86
Egg weight at 28 wks (g)	-3.87	-4.42
Egg weight at 40 wks (g)	-2.12	-2.02
Egg number at 40 wks (HH)	-3.51	2.8
Egg number at 40 wks (HD)	-0.17	3.82
Egg number at 40 wks (S)	-0.09	3.85

Supply of germplasm

A total of 1,91,970 chicks were sold to farmers, 24,427 breeding birds sold to institutions and 2377 culled birds were sold to households (Total germplasm **2,16,397**).

Revenue generation

The centre has generated the revenue of Rs.**53.84** lakhs, which was **218.15**% of the recurring expenditure (Rs. 24.68 lakhs).

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Programme activity assigned

- Conservation, characterization and improvement of native chicken germplasm.
- The egg production up to 64 weeks of age will continue to be the selection criterion in IWN and IWP strains.
- The centre will 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 S14 generation of IWN and IWP strain was evaluated up to 40 weeks of age. The S6 generation of IWD and IWK strain was maintained and evaluated up to 40 weeks of age.
- Fertile eggs of IWN and IWP strains were procured from Mannuthy centre and fertile eggs of Control population were procured from DPR, Hyderabad and chicks of S0 generation were produced. Chicks of S7 generation of IWD and IWK strains were also produced.
- The S1 generation of Native and RIR breed was evaluated up to 40 weeks of age. The F1 cross (IWN x Native) and the Terminal cross (F1 X RIR) were evaluated up to 64 weeks of age.
- The chicks of S2 generation of native birds were produced. The chicks of RIR breed (S0 generation) were also produced from the stock already existed at the centre. The chicks of F1 cross (IWN x Native) and Terminal cross (F1 X RIR) were also produced.

Details of the implementation of programme and results achieved

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

Evaluation of native germplasm

As per the new objectives of AICRP on Poultry Breeding that is being reoriented towards rural poultry, the breeding programme was started for the improvement and utilization of native birds. During the reporting period, chicks of S1 generation of native birds and RIR were produced and evaluated up to 40 weeks of age.

Table 12. Production performance of Native (S1) and RIR (S1) birds

Traits	Native			RIR		
	N	S1	S0	N	S1	S0
No. of pullets housed	422			564		
ASM (d)	321	173.6±0.72	159.9±0.46	450	181.5±0.80	172.3±0.54
Body weight (g)						
16 wks	422	1005±7.6	-	564	1218±6.6	-
40 wks	282	1493±13.2	1471±9.8	414	1845±9.2	1763±7.0
EP up to 40 wks (No.)	279	71.3±1.28	74.1±0.94	412	68.5±0.98	62.6±0.95
Egg weight(g)						
28 wks	264	38.37±0.19	36.98±0.14	371	49.33±0.17	46.17±0.17
40 wks	189	43.93±0.29	44.83±0.16	351	54.89±0.22	54.87±0.15
Feed cons./bird (kg) 17-40 wks		15.2	17.5		18.79	18.5
Mortality (%) 17-40 wks		28.67	2.75		23.58	3.72

Performance of Native and RIR breeds

Production performance of Native and RIR birds in S1 generation is presented in Table 12. A total of 422 pullets of native and 564 pullets of RIR were housed individually at 16 weeks of age and evaluated up to 40 weeks of age. In S-1 generation the ASM has increased in native birds, while egg production up to 40 weeks of age reduced with almost similar body weight and egg weight as compared to previous generation. In RIR breed both ASM and 40 weeks egg production have increased as compared to S0 generation with not much change in egg weight at 40 weeks of age.

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 13. During the reporting period, a total of 170 pullets of F_1 cross (IWN X Native) and 150 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 and egg weight were higher in terminal cross as compared to F_1 cross. Feed consumption was higher in terminal cross as compared to F_1 cross. Mortality was much higher in birds of F_1 and 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 14.

Table 14. Performance of Terminal Cross (Farm and Field Testing)

Traits	Terminal Cross (F_1 x RIR)	Terminal Cross (F_1 x RIR)
	Farm Testing	Field Testing
No. of pullets housed	150	15
ASM (d)	162.69 ± 0.99	161 (First egg)
Body weight (g)		
20 wks	1223 ±15.23(F)	1351 (M+F)
40 wks	1755 ±19.98(F)	1484 (F)
Egg production up to 40 wks (No.)	94.41 ± 1.18	59.00
Egg weight (g)		
28 wks	45.52 ± 0.23	-
40 wks	49.02 ± 0.34	41.00
Feed cons./bird (kg) 17-40 wks	18.675	-

Table 13. Performance of F_1 and Terminal cross (Farm Testing)

Traits	N	F_1 (IWN x Native)	N	Terminal Cross (F_1 x RIR)
No. of pullets housed	170		150	
ASM (d)	132	161.05±1.37	124	162.69 ± 0.99
Body weight (g)				
16 wks	170	982.77±13.96	150	1223.05±15.23(F)
40 wks	93	1468.39±19.05	116	1755.24±19.98(F)
64 wks	75	1616.91±20.22	112	1879.21±18.13(F)
EP. (No.)				
up to 40 wks	93	89.36±2.14	116	94.41±1.18
up to 64 wks	75	188.43±5.18	112	208.94±3.85
Egg weight (g)				
28 wks	115	43.04±0.28	126	45.52±0.23
40 wks	79	45.15±0.43	106	49.02±0.34
64 wks	47	51.52±0.55	98	53.21±0.30
Feed cons./bird (kg)				
17-40 wks	-	18.120	-	18.675
17-64 wks	-	35.597	-	37.608
Mortality (%)				
17-40 wks	-	41.18	-	22.67
17-64 wks	-	47.06	-	26.67

Incubation records of Native (S_2 Gen.), RIR (S0 Gen. from Ludhiana), F_1 (IWN X Native) and Terminal cross (F_1 X RIR)

Incubation and hatching results of native, RIR and their crosses are presented in Table 15. Compared to previous generation, fertility (3.38%) was increased while hatchability (-3.88 and -7.85% on TES and FES) in native chicken has come down in S2 generation. Similarly in RIR fertility (7.03) and hatchability (8.39 and 3.06 on TES and FES) increased. Among two way cross (F_1=IWN X Native) and three way (Terminal) cross (F1x RIR) decreased fertility was observed but hatchability was improved compared to previous generation. The existing population of RIR breed (S1 generation) was replaced with RIR breed sourced from Ludhiana as recommended by the previous Annual Review Meeting.

Growth Performance

Native (S-2 generation) and RIR chickens were evaluated for growth traits up to 8 weeks of age (Table 16). Body weights recorded at day old and 4 weeks of age in native chicken have decreased while that recorded at 8 weeks of age increased. In RIR breed body weight recorded at 4 and 8 weeks of has increased as compared to S-1 generation. There was no change in quantity of feed consumed per bird during 0-8 weeks of age in both germplasm. There was no change in mortality recorded during 0-8 weeks of age and they are under acceptable level in both native and RIR breed.

Performance of F1 and F_1 X RIR cross evaluated up to 8 weeks of age during the reporting period of 2017-18 (Table 17). Except for body weight at 8 weeks of age in TC, body weights of both crosses recorded at different ages has increased in the present generation. Feed consumption per bird of both crosses during 0-8 weeks of age was almost similar to those recorded in previous generation. Mortality during 0-8 weeks of age has increased as compared to previous generation.

B. Improvement of IWN and IWP strains of White Leghorn

During the period under report the S14 generation of IWN and IWP strain was evaluated up to 40 weeks of age. During the period under report fertile eggs of IWN and IWP strains were procured from Mannuthy centre as well as fertile eggs of control population were procured from ICAR-DPR, Hyderabad and chicks of S0 generation were produced.

Table 15. Summary of incubation and hatching results of RIR (S0), Native (S2), F_1 (IWN x Native) and Terminal Cross (F1 x RIR)

Gens.	No. of hatches	Eggs set (Nos.)	Fertile eggs (Nos.)	Fertility (%)	Total chicks (Nos.)	Good chicks (Nos.)	Hatchability (%)	
							TES	FES
Native chicken								
S-0	1	2831	2429	85.80	2072	-	73.19	85.30
S-1	2	2363	1954	82.69	1660	1552	70.25	84.95
S-2	**2**	**1989**	**1712**	**86.07**	**1320**	**1284**	**66.37**	**77.10**
RIR								
S-0	**1**	2463	2260	91.75	1636	-	66.42	72.39
S-1	2	2685	2340	87.15	1832	1780	68.23	78.29
S-0 (Ludhiana)	**1**	**1805**	**1700**	**94.18**	**1383**	**1360**	**76.62**	**81.35**
F_1 (IWN X Native)								
2015-16	1	1204	1034	85.88	781	-	64.87	75.53
2016-17	1	950	868	91.37	581	579	61.16	66.94
2017-18	**1**	**726**	**588**	**80.99**	**469**	**452**	**64.60**	**79.76**
TC (F1 X RIR)								
2015-16	1	3245	2845	87.67	2597	-	80.03	91.28
2016-17	1	760	671	88.29	532	527	70.00	79.28
2017-18	**1**	**435**	**375**	**86.21**	**309**	**298**	**71.03**	**82.40**

Table 16. Growth performance of native and RIR breeds of chicken in last two generations

Traits	N	Native (S-2)	Native (S-1)	N	RIR (S-0, Ludhiana)
Body weight (g)					
day old	1295	29.14 ± 0.1	30.8 ± 0.21	200	35.8 ± 0.27
4 wks	100	165.4 ± 3.3	170.5 ± 3.16	200	223.9 ± 2.41
8 wks	200	566.4 ± 6.98	463 ± 8.11	200	724.3 ± 7.28
Total feed consumption per bird (kg)					
0-8 wks	-	1.60	1.57	-	1.604
9-16 wks	-	-	3.32	-	-
Mortality (%)					
0-8 wks	-	6.54	7.15	-	2.42
9-16 wks	-	-	5.83	-	-

Table 17. Growth performance of F1 and (F_1 X RIR) at farm conditions in last two generations

Traits	N	(IWN x Native) F_1 (2017-18)	(IWN x Native) F_1 (2016-17)	N	(F_1 x RIR) TC (2017-18)	(F_1 x RIR) TC (2016-17)
Body weight on pooled sex (g)						
0 day	454	30.10± 0.15	30.84 ± 0.34	100	36.00± 0.29	39.78± 0.40
4 wks	100	158.2± 1.18	158.1 ± 3.27	100	217.4± 4.56	196.4± 3.79
8 wks	355	471.6± 5.76	420 ± 12.4	200	574.3±5.41	601 ± 12
16 wks	-	-	983 ±13.96	-	-	1223± 15.2
Feed consumption per bird (kg)						
0-8 wks		1.587	1.55		1.6	1.63
9-16 wks		-	3.47		-	3.49
Mortality (%)						
0-8 wks		5.31	4.15		6.04	0.82
9-16 wks		-	15.6		-	3.92

TC: Terminal cross

Selection records

The summary of selection records of IWN and IWP strains during last five generations is presented in Table 18.

Incubation records

The summary of incubation records of IWN and IWP strains during last five generations is presented in Table 19. Fertility and hatchability of IWN strain has come down drastically in S14 generation as compared to previous generation. Similarly, fertility of IWP strain has come down but hatchability has improved as compared to the previous generation. Fertility and hatchability in control population was better as compared to IWN and IWP strains in S14 generation.

Table 18. Summary of selection records of IWN and IWP strains during last five generations

Strains	Gen.	Sires	Dams	Ne	SD in females	SI
IWN	S-9 to S-10	50	239	165	16.63	0.311
	S-10 to S-11	50	269	169	17.35	0.619
	S-11 to S-12	50	262	168	11.40	0.41
	S-12 to S-13	50	249	166.6	15.70	0.486
	S-13- to S-14	50	301	171.5	-	0.28
IWP	S-9 to S-10	50	256	167	20.92	0.560
	S-10 to S-11	50	266	168	11.10	0.594
	S-11 to S-12	50	271	169	3.98	0.13
	S-12 to S-13	50	241	165.6	15.70	0.406
	S-13- to S-14	50	302	171.59	-	0.23

Table 19. Summary of incubation records in IWN, IWP and Control during last five generations

Gen.	Strains	Eggs set	Fertility (%)	Hatchability (%)	
				TES	FES
S-10	IWN	6977	84.17	61.01	72.48
	IWP	6370	84.84	67.11	79.10
	Control	556	75.89	65.64	86.49
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

Mortality

The summary of mortality records of IWN, IWP and Control population during last three generations is presented in Table 20. Mortality during 0-8 weeks of age has increase in the present generation as compared to previous generation. However, mortality during 17-40 weeks of age in IWN and IWP is lesser in the present generation as compared to the previous generations.

Table 20. Percent mortality during last three generations

Gen	Strains	0-8	9-16	17-40	41-64	17-64
S-12	**IWN**	4.21	2.67	3.12	9.15	11.98
	IWP	4.74	3.57	3.44	11.96	14.98
	Control	3.78	3.19	2.31	10.65	12.72
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**	-	-	-

Table 21. Performance of IWN and IWP strains and Control population in S14 generation

Traits	N	IWN	N	IWP	N	Control
No. of pullets housed	348		350		368	
ASM (d)	347	145.4 ± 0.47	346	148.3 ±0.58	47	148.5 ± 0.73
Body weight (g)						
16 wks	348	1080±4.25	350	1101 ±3.92	168	972.6± 5.88
40 wks	296	1566±8.40	284	1624±8.51	-	-
Egg production up to 40 weeks (Nos.)						
Survivors	294	120.7±0.67	283	110.4±0.84	-	-
Hen housed	348	109.5±1.55	350	97.5±1.68	-	-
Hen day	-	119.5	-	107.8	-	-
Egg weight (g)						
28 wks	337	50.54±0.15	323	50.77±0.16	-	-
40 wks	294	52.09±0.15	278	54.06±0.18	-	-
Feed consumption /bird (kg)						
17-40 wks	-	18.60	-	18.36	-	-
Mortality (%)						
17-40 wks	-	1.44	-	6.00	-	-

Growth performance

The growth performance up to 40 weeks of age in S14 generation is presented in Table 21. 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.

Production performance of IWN, IWP strains and Control population

Egg production up to 40 weeks of age was higher in IWN than IWP strain (Table 21). Egg production up to 40 weeks of age was higher in both the strains as compared to previous generation (Table 22). Because of curtailment in budget as well as the decision made during previous Annual Review Meeting to replace the IWN and IWP stocks with those from Mannuthy (Kerala), the birds of control population were sold in the beginning of laying period and hence no production data is given for control population (Table 21).

Feed consumption

Feed consumption from 17-40 weeks of age in IWN and IWP strains in S14 generation was almost similar (Table 21).

Age at sexual maturity and egg weight

Age at sexual maturity was lesser in IWN strain as compared to IWP strain and control population in S14 generation (Table 22). Egg weight at 40 weeks of age was higher in IWP strain as compared to IWP strain). Summary of age at sexual maturity and egg weight in IWN, IWP and Control population during last five generations are presented in Table 22.

Incubation records of IWN, IWP (S-0 generation) (from Mannuthy) strains & Control population

Fertility and hatchability (on total and fertile egg set base) were excellent in IWN and IWP strains. They were also very good in control population (Table 23). Feed consumption and mortality up to 8 weeks of age in IWN and IWP strains (Mannuthy) and control population is presented in Table 24.

Table 22 Egg production in IWN, IWP and Control population over last five generations

Traits	Gen.	IWN	IWP	Control
ASM (d)	S-10	137.1	139.1	155.5
	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	145.4	148.3	148.5
EP40 wks	S-10	118.7	115.5	89.63
	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	120.66	110.41	-
EP64 wks	S-10	250.0	243.6	197.04
	S-11	259.6	254.6	218.6
	S-12	253.1	243.6	206.1
	S-13	211.05	197.87	169.45
EP72 wks	S-10	288.3	277.2	-
	S-11	301.8	300.3	-
	S-12	294.2	275.0	-
	S-13	233.5	219.5	-
EW40 wks	S-10	51.30	52.64	51.92
	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	-
EW64 wks	S-10	52.37	53.58	53.08
	S-11	54.24	55.61	55.30
	S-12	52.83	52.76	54.58
	S-13	53.37	55.31	55.64

Table 23. Summary of incubation and hatching of IWN, IWP strains and Control population

Traits	S-0		
	IWN	IWP	Control
No. of hatches	1	1	1
No. of eggs set	2181	2207	807
No. of fertile eggs	2071	2041	729
Fertility (%)	94.96	92.48	90.33
Good chicks	1842	1856	610
Total chicks	1874	1881	632
Hatchability (%)			
TES	85.92	85.23	78.31
FES	90.49	92.16	86.69

Table 24. Performance of IWN, IWP (S-0 gen.) strains and Control population

Traits	S-0		
	IWN	IWP	Control
Feed consumption/ bird (kg) 0-8 wks	1.65	1.61	1.61
Mortality (%) 0-8 wks	4.23	3.02	4.00

C. Performance of IWD and IWK strains

Performance of IWD and IWK strains in S6 generation is presented in Table 25. The S6 generation of IWD and IWK strain was maintained and evaluated up to 40 weeks of age. A total number of 215 pullets from IWD and IWK strains housed for recording production traits. Age at sexual maturity was higher in IWK as compared to IWD strain. Body weight at 40 weeks of age was almost similar in IWD and IWK strains. Egg production up to 40 weeks of age was higher in IWD as compared to IWK strain. Egg weight was almost similar in both the strains. Feed consumption was almost similar in both the strains during 17-40 weeks of age. Mortality was within permissible limit in both the strains during 17-40 weeks of age.

Table 25. Performance of IWD and IWK strains

Traits	N	IWD	N	IWK
ASM (d)	205	149.3 ± 0.71	200	152.2 ± 0.70
Body weight (g) at				
16 wks	215	1199±9.19	215	1104 ± 8.51
40 wks	208	1468±10.7	211	1440±10.8
EP 40 wks				
Survivor	208	105.2±1.18	211	100.9±1.09
HH	215	103.8±1.30	215	100.2±1.15
HD	-	104.94	-	100.75
Egg weight (g) at				
28 wks	209	49.65±0.15	211	49.73±0.19
40 wks	196	52.47±0.24	206	53.21±0.26
Feed consumption / bird (kg)				
17-40 wks	-	17.35	-	17.40
Mortality (%) 17-40 wks	-	3.26	-	1.40

Table 26. Summary of incubation and hatching of IWD and IWK strains in last two generations

Traits	S-7		S-6	
	IWD	IWK	IWD	IWK
No. of hatches	1	1	2	2
No. of eggs set	996	910	996	1268
No. of fertile eggs	942	872	897	1167
Fertility (%)	94.58	95.82	90.06	92.03
No. of chicks	845	820	637	838
Total no. of chicks	854	828	656	885
Hatchability (%)				
TES	85.74	90.99	65.86	69.79
FES	90.66	94.95	73.13	75.84

Regeneration of IWD and IWK strains

Summary of incubation and hatching of IWD and IWK strains in last two generations is presented in Table 26. Fertility and hatchability (on total and fertile egg set base) of both strains were better in S-7 generation as compared to S-6 generation. Feed consumption and mortality up to 8 weeks of age in IWD and IWK strains is presented in Table 27.

Table 27. Performance of IWD and IWK strains (S-7 generation)

Traits	S-7	
	IWD	IWK
Feed consumption / bird (kg) 0-8 wks	1.60	1.59
Mortality (%) 0-8 wks	2.90	2.29

Germplasm supply

The centre supplied a total of 49,036 number of germplasm during the year 2017-18.

Revenue generation

The centre has generated Rs. 18.41 lakhs which is 71.62% of the expenditure on feed cost (Rs. 25.62 lakhs). Centre needs to increase the both germplasm supply and revenue generation.

Karnataka Veterinary, Animal and Fishery Sciences University, Bengaluru

Programme activity assigned

- Evaluation and selection of local native chicken germplasm and crossing of PB-1 X Local to produce F1
- 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 2017-18

- Centre completed purification of local native germplasms and initiated evaluation of growth and production performance.
- Data on body weights and other economic traits was recorded.
- Hatching of S-1 chicks and crossing of PB-1 X Local to produce F1.
- Production traits of PB-1, PB-2 and Control lines were evaluated for S-9 and S-22 generation, respectively.
- The S-10 and S-23 generations of PB-1 and PB-2 along with Control lines were regenerated and evaluated for juvenile traits.
- Participated in RSPT, 2017 at Gurgaon.

Details of the implementation of programme and results achieved

During the current year, centre completed the purification of local native chicken and evaluated. The body weight of indigenous germplasm at day old and 8 weeks was recorded. During the current year, production traits of PB-1, PB-2 and Control lines were evaluated for S-9, S-22 generation respectively. The S-10 and S-23 generations of PB-1 and PB-2, along with control lines were regenerated and evaluated for juvenile traits. Centre also participated in RSPT, 2017 at Gurgaon.

Collection, Conservation and Evaluation of native germplasm

Purification of native chicken germplasm was completed as per the technical programme. The solid black coloured and pure white plumage birds were culled and uniform attractive plumage coloured birds were retained. S-2 generation of native chicken was hatched and a total of 2238 chicks were housed for evaluation of growth and production performance. The average body weight of day old and 8 week of native chicken was 28.53 and 437.8 g, respectively. The feed efficiency at 0-8 week was 3.72. The overall survivability percentage was 98.21 in 0-8 weeks.

The egg production and other production traits in native birds were evaluated. The average age at sexual maturity was 165.47 days. Egg weight at 28th week was 39.96 g and at 40th week was 43.64 g (Table 28). The purification of indigenous germplasm was undertaken for two generations. The solid black coloured and pure white plumage birds were culled.

Table 28: ASM, egg weight and weight traits in native birds (S-1)

Traits	N	Mean ± SE
Body weight(g)		
8 wks	1267	477.8±3.14
12 wks	100	785.6 ± 11.68
20 wks	487	1110 ± 6.62
40 wks	127	1524± 26.51
52 wks	126	1574± 28.71
ASM (d)	289	165.7 ± 0.67
Egg weight (g)		
28 wks	270	39.96
40 wks	270	43.64

PB1 X Native birds

In order to develop location specific chicken variety and as per the technical programme, the breeding programme was initiated. PB1 males were crossed with native variety and 315 number F1 chicks were obtained. The average eighth week body weight of the F1 males was 886.9 ± 21.64 g and that of females was 768.7 ± 23.51 gm. The overall mean body weight was 823 ± 16.38 g. The 0 to 8 week survivability was 98.92%. The average day old chick weight was 33.5g.

Conservation and utilization of elite germplasm Selection records

The number of sires and dams contributed to next generation were 64 and 512 in PB1 while 57 and 451 in PB2, respectively. The effective number of

parents was 228 in PB1 and 202 in PB2. The rate of inbreeding was 0.0022 and 0.0023 in PB1 and PB2 populations, respectively. Summary of selection records for PB-1 and PB-2 are presented in Table 29 and 30, respectively.

Table 29. Summary of selection records for PB-1

Parameters	S-9	S-10
Sires	64	64
Dams	512	512
Sires contributed	58	44
Dams contributed	507	352
Effective number	227	228
Rate of Inbreeding	0.002	0.0022
SD for male (g)	273	176
SD for female (g)	79	66
Average selection differential (g)	176	121
Effective selection differential (g)	214	132
Selection intensity (σ)	1.54	1.34

Table 30. Summary of selection records for PB-2

Parameters	S-22	S-23
Sires	58	57
Dams	464	451
Sires contributed	58	35
Dams contributed	457	280
Effective number	210	202
Rate of Inbreeding	0.0024	0.0023
SD for male (g)	235	207
SD for female (g)	81	54
Average selection differential	158	131
Effective selection differential	184	138
Selection intensity (σ)	1.48	1.26

In PB-1 and PB-2, the average selection differential increased indicating more variability in the population but selection intensity decreased marginally in both the lines compared to previous generation.

Incubation information

The fertility and hatchability records for the PB-1, PB-2 and Control populations are presented in Table 31. During the current year a total of 1730, 1010 and 127 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.

Table 31. Incubation records for PB-1, PB-2, and Control line

Gen.	Eggs set (No.)	Fertility (%)	Good chicks (No.)	Hatchability (%)	
				TES	FES
PB-1					
S-9	3925	91.34	3161	83.03	90.91
S-10	2243	89.34	1730	79.80	89.32
PB-2					
S-22	2569	88.98	1953	77.85	87.49
S-23	1353	88.03	1010	77.16	87.66
Control					
S-22	210	57.14	94	45.71	80.00
S-23	202	79.20	127	65.35	82.50

Mortality

The mortality in the present generation during 0 to 5 weeks was 1.91, 1.09 and 0.02 % in PB-1, PB-2, and Control line, respectively. Mortality during 0-5 weeks of age decreased in PB-2 and control compared to previous generation. Low mortality in juvenile shows better management of flock health (Table 32).

Table 32. Mortality for PB-1, PB-2 and control line (%)

Gen.	0-5 wks	6-16 wks	17-40 wks
PB-1			
S-9	0.89	1.18	0.72
S-10	1.91	2.47	NC
PB-2			
S-22	1.18	2.80	2.83
S-23	1.09	1.40	NC
Control			
S-22	1.02	1.96	2.00
S-23	0.00	5.51	NC

NC –Not completed, NR- Not reported

Body weight and feed efficiency

The body weight at day old recorded in PB-1, PB-2 and Control lines were 40.63 (1730 Nos), 43.52 (1010 Nos) and 40.15 (127 Nos) g, respectively. The body weight at day old and 5 week of age increased in

PB-1 and PB-2 lines but it decreased in control line as compared to previous generation. In the current year, Feed Conversion Ratio showed marginal improvement in PB-1 over previous generation whereas decreased trend was observed in PB-2 and Control lines as compared to previous year (Table 33).

Table 33. 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-9	39.86 (3161)	1046±2.89 (3133)	2.13 (3133)
S-10	40.63 (1730)	1260 ± 3.48 (1697)	2.07
PB-2			
S-22	40.08 (1953)	1017±3.73 (1930)	2.25
S-23	43.52 (1010)	1085±5.14 (999)	2.38
Control			
S-22	40.05 (94)	719.8±15.21(92)	2.71
S-23	40.15 (127)	562.4±9.74 (127)	3.98

* Figures in paracentesis 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 34, 35 and 36. The average body weight at 20 week recorded in PB-1 (S-9) was 2290.54±13.09 (831) g. Corresponding values in PB-2 was 2178.62±15.87 (697) g, respectively. The body weight at 20 week of age increased in both the lines, more than the target body weight of 2400g. Proper feed restriction should be followed to maintain the target body weight.

The ASM recorded in S-9 of PB-1 and S-22 of PB-2 and Control lines were 187.6±0.65 (256), 191.1±0.46 (456) 192.0±1.68 (48) days, respectively. Decrease of ASM was observed in PB-1 (S-9) but it increased in case of PB-2 and Control line.

The average egg production at 40 weeks of age (survivor basis) in PB-1, PB-2 and Control lines were 57.01±0.53 (511), 56.93±0.39 (449) and 66.14±1.43 (47) eggs, respectively. Corresponding values at 52 weeks of age were 110.11±0.67 (486), 97.72±0.74 (422) and 117.36±1.69 (47) eggs, respectively. The egg production up to 40 and 52 weeks of age decreased in PB-1 (S-9). In PB-2 and Control lines the egg production at 40 and 52 increased in S-22 generation.

Table 34. Adult body weight at 20 and 40wks of females in different lines

Gen.	Body weight (g)	
	20 wks	40 wks
PB-1		
S-8	2470±12.04(830)	3191±14.75 (500)
S-9	2290±13.09 (831)	3273 ± 23.33 (200)
S-10	2470±19.24 (426)	NC
PB-2		
S-21	2297±14.17(913)	3253±27.42 (157)
S-22	2178±15.87 (697)	3181 ± 27.20 (156)
S-23	2440±35.58 (214)	NC
Control		
S-21	1850±24.83 (49)	2850±35.18 (48)
S-22	1740±26.21 (50)	2850±44.55 (47)
S-23	1880±56.32 (45)	NC

Table 35. Age at sexual maturity and egg weight in different lines

Gen.	ASM (d)	Egg wt (g) at 32 wks
PB-1		
S-8	181.16±0.38 (512)	56.88±0.28 (350)
S-9	201.48±0.65 (512)	56.73±0.32 (300)
S-10	187.64 + 0.65 (256)	-
PB-2		
S-20	177.64±0.51(512)	56.72±0.20 (380)
S-21	180.78±0.50 (464)	56.42±0.33 (320)
S-22	191.16±0.46 (456)	57.10±0.33 (310)
Control		
S-21	187.37±1.90 (48)	51.85±1.02 (48)
S-22	192.06±1.68 (48)	52.40±0.67 (50)

Table 36. Production performance of females

Gen.	Egg production (Nos.)	
	40 wks	52 wks
PB-1		
S-8	68.71 ±0.46 (500)	115.61±0.66 (482)
S-9	57.01±0.53 (511)	110.11±0.67 (486)
PB-2		
S-21	53.27±0.50 (455)	91.60±0.72 (438)
S-22	56.93±0.39 (449)	97.72±0.74 (422)
Control		
S-21	64.23 ±2.30 (48)	99.31 ±2.47 (32)
S-22	66.14±1.43 (47)	117.36±1.69 (47)

Heritability

The heritability (h^2) of the body weight at 5th week in S-23 generation of PB-2 was 0.08±0.03. Heritability in PB-1 was not reported.

Response

The average phenotypic and genetic response of 5 week body weight over 11 generations in PB-1 was 14.4 and 24.4g, respectively. Corresponding values for egg production up to 40 weeks of age over 10 generations in PB-1 was -0.09 and -1.73 eggs. The average phenotypic and genetic response of 5 week body weight in PB-2 over 12 generations was 9.25 and 17.08 g, respectively. Corresponding values for egg production in PB-2 up to 40 week over 12 generations was -0.96 and -1.74 eggs (Table 37). The phenotypic as well as genetic response of egg production traits decreased in PB-1 and PB-2.

Table 37. Genetic and Phenotypic response to 5 week body weight and 40 week egg production in PB-1 and PB-2

Trait	PB-1		PB-2	
	Phenotypic response	Genetic response	Phenotypic response	Genetic response
5 wks body weight (g)	14.4	24.40	9.25	17.08
EP40 (Nos)	-0.099	-1.73	-0.962	-1.74

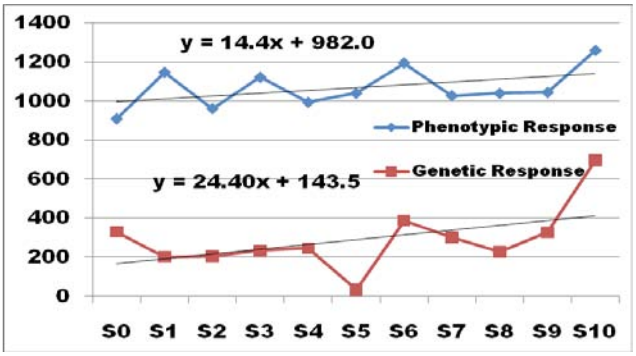

Fig 1. Genetic and phenotypic response to 5 week body weight in PB-1

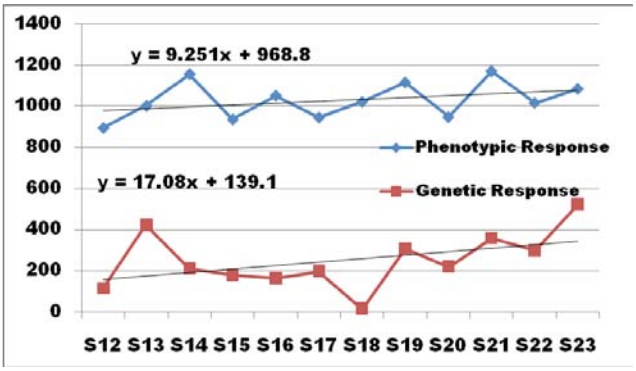

Fig 2. Genetic and phenotypic response to 5 week body weight in PB-2

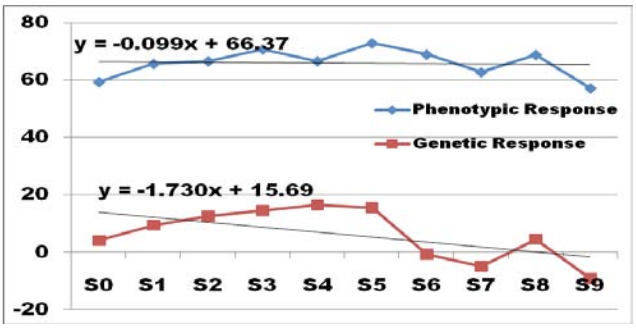

Fig 3. Genetic and phenotypic response of egg production upto 40 wks in PB-1

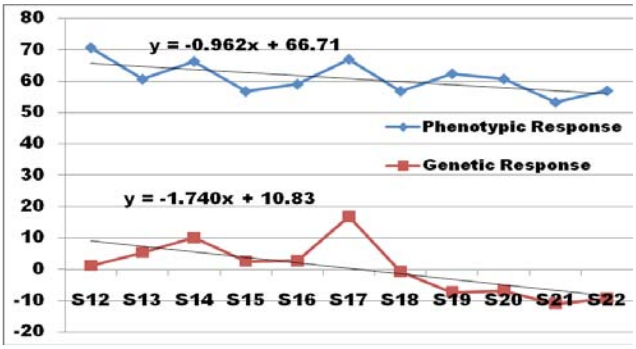

Fig 4. Genetic and phenotypic response of egg production upto 40 wks in PB-2

Random Sample Poultry Performance Test

The centre participated in the 47th RSPPT for broilers at Gurgaon, Haryana during 2017-18. The average body weights at 6 and 7 weeks of age were 1692 and 2080 g in Raja - II (PB1 x PB2). The feed efficiency was 1.56 between 0 - 7 weeks. The dressing percentage was 71.5%.

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

No. of chicks reared- 160

Average 6th week body weight	: 1.62 kg
Average 7th week body weight	: 2.08 kg
FCR	: 2.03
Survivability	: 98.13%

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

1. Expenditure

Cost of chick 160 X Rs.16	= 2,576.00
Cost of feed (approx) upto 6 weeks 160 birds X3.29kg feed X Rs.30	= 15,495.00
Other expenditure 160 birds X Rs.10	= 1,600.00
Total Expenditure	= 19,671.00

2. Income

150 birds X 1.62kg X Rs.100	= Rs.25,434.00
Profit (approx) 25,434- 19,671	= **Rs 5,763.00**

Economics of rearing Commercial Raja II (PB-1 X PB-2) at Farm

No.of chicks reared	: 200
Mortality	: 2.5%
Avg. 6th week body weight	: 1,598 g
FCR	: 1.98

Expenditure:

Cost of chicks @Rs.16/chick X 200	= 3,200-00
Cost of feed(195x1.598x1.98xRs.30)	= 18,509-00
Other expenditure @Rs.10/bird	= 1,950-00
Total Expenditure	23,659-00

Receipt

195 X1.598 X Rs.100/kg	= 31,161-00
Profit = 31,161-23,659	= **7,502-00**

Frequency distribution of 5 week body weight

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

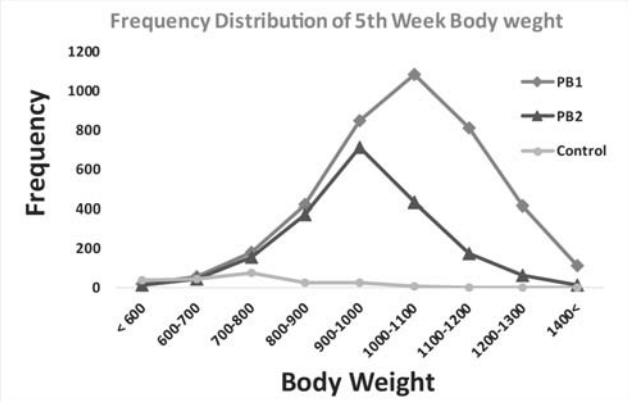

Fig. 5. Frequency distribution of 5th week body weight in PB-1 and PB-2 lines

Germplasm

A total of 2,03,520 germplasms (1,85,380 day old chicks and 18,140 hatching eggs) were supplied to farmers and other stakeholders (371 beneficiaries) during the current year.

Receipts

During the year 2017-18, the centre generated revenue of Rs. 53.43 lakhs which is 162.47 % of expenditure on feed cost (Rs.32.89 lakhs).

Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana

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 2017-18

- Centre has initiated evaluation of native chicken germpalsm.
- A total of 1435 good chicks of local native chicken and 57 chicks from PB-2 X desi were hatched.
- Different parameters viz; fertility percent, hatchability percent, juvenile traits, ASM, egg weights at 28 and 40 weeks , egg production upto 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-10 generation of PB-1 and S-42 generation of PB-2 population.
- During the current year juvenile traits and production traits up to 52 weeks were evaluated.

Collection, Conservation and Evaluation of native germplasm

The evaluation of local native chicken germplasm was carried out. A total of 1435 fertile eggs were set for hatching. The percent fertility in native local chicken was 89.70%. The hatchability percent on TES and FES were 57.46 and 60.06, respectively. The body weight of chicks at day one, 4 and 8 week of local chicken were 38.47 ± 0.06 (1410), 572.1 ± 5.41 (1089), 737.9 ± 6.44 (1068)g (Table 38). The mortality percent in different age groups of 0-8, 9-20, 21-40 and 21-52 were 12.78, 6.35, 2.92 and 1.35, respectively. The performance of PB2 (M) x DESI (F) in farm and field were also recorded. . The body weight of chicks at day one, 4 and 8 week of PB-2 x Desi was 37.92 ± 0.32 (50), 612.0 ± 14.22 (45), 926.6± 17.80 (45)g in farm and at 4 and 8 weeks at field were 359.1±34.0 (20) and 971.0±127.3 (20) g, respectively. Egg production up to 40 weeks of PB2 X Local was 77.20 eggs. Cross had a lower ASM compared to local.

Table 38. Comparative performance of Native local germplasm and its crosses with PB-2

Traits	Local Germplasm		PB2 (M) x Local (F) in Farm		PB2 (M) x Local (F) in Field	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g)						
Day Old	1410	38.47±0.06	50	37.92±0.32	20	NA
4 wks	1089	572.1±5.41	45	612.0±14.22	20	359.1±34.0
8 wks	1068	737.9±6.44	45	926.6±17.80	20	971.0±127.3
12 wks	1026	1280±7.74	45	1261±27.47	20	1310±114.96
20 wks	855	2006±10.08	45	1965±32.02	20	2191±124.25
40 wks (F)	480	2370±15.23	44	2799±90.06		NA
ASM (d)	483	164.3±0.71	44	142.9±2.33		NA
Egg weight (g)						
28 wks	380	44.92±0.62	-	-	-	-
40 wks	379	46.91±0.20	-	-		-
Egg Production (Nos.)						
40 wks	379	59.07±0.97	44	77.20±2.94		NA
52 wks	300	97.82±1.25	-	-	-	-

Conservation and utilization of elite germplasm

Selection records

Summary of selection records over the last 2 generations for PB-1 and PB-2 are presented in Table 39. The PB-1 population was reproduced utilising 62 sires and 372 dams during S-10 generation and S-42 generation of PB-2 population was reproduced utilising 80 sires and 480 dams. The intensity of selection improved in the current generation in PB-1 as compared to previous generation.

Table 39. Summary of selection records in PB-2

Parameters	PB-1		PB-2	
	S-9	S-10	S-41	S-42
Sires	62	62	80	80
Dams	372	372	480	480
Sires contributed	62	62	80	80
Dams contributed	349	372	480	480
Effective number	252	213	274.1	274
Rate of inbreeding	0.002	0.002	0.002	0.002
Average Expected selection differential	209.43	145	117.93	44
Selection intensity (σ) M	3.14	3.32	3.17	3.09
F	2.96	2.96	2.99	2.76
Expected response	52.36	2.90	29.48	0.88

Incubation information

During the current generation a total of 4398, 2656 and 407 good chicks were hatched in PB-1, PB-2 and Control populations, respectively (Table 40). The fertility was 73.90 and 80.06 % in PB-1 and PB-2 lines. The hatchability on total eggs set was 57.8, 48.8 and 64.60% in PB-1, PB-2 and Control lines, respectively. The fertility and hatchability on TES decreased 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 18.10, 15.80 and 8.10 %, respectively (Table 41). During grower period mortality of 16.19, 16.70 and 14.50 % was recorded in PB-1, PB-2 and Control, respectively. Mortality increased across all age groups and was high in 0-5 weeks in PB-2 and Control lines as compared to last year. Centre needs extra attention on health management of the flock.

Table 40. Incubation records for PB-1, PB-2, Control line

Gen./ year	Eggs set (No.)	Fertility (%)	Good chicks (No.)	Hatchability (%)	
				TES	FES
PB-1					
S-9	5981	73.3	3699	65	88.6
S-10	7971	73.93	4398	57.83	78.22
PB-2					
S-41	4954	95.2	4332	89.4	93.9
S-42	5442	80.06	2656	48.80	61.90
Control					
2016-17	600	98.2	434	72.3	73.7
2017-18	630	71.90	407	64.60	89.84

Table 41. Mortality percentage at different ages in PB-1, PB-2 and Control

Gen./year	0-5 wks	6-20 wks	21-40 wks
PB-1			
S-9	18.58	11.33	11.87
S-10	18.10	16.19	10.9
PB-2			
S-41	11.88	8.67	8.59
S-42	15.80	16.70	5.70
Control			
2016-17	23.09	12.98	14.77
2017-18	8.10	14.50	5.60

Body weight

During current generation the average body weight at 5 weeks of age was 1200±3.78 (3411), 934.4±7.24 (1265) and 871.4±10.58 (349) g in PB-1, PB-2 and Control lines, respectively (Table 42). The feed efficiency up to 5 weeks of age improved in PB-2 line over last generation. The body weight at 5 weeks of age increased in PB-1 line and decreased in PB-2 and control lines as compared to previous generation

Table 42. Body weight (g) and feed efficiency at 5 weeks during last two generations

Gen./ year	5 wks	Feed efficiency (upto 5 wks)
PB-1		
S-9	1157±4.3(2118)	2.0
S-10	1200±3.78 (3411)	2.1
PB-2		
S-41	1061±3.54 (1960)	2.1
S-42	934±7.24 (1265)	1.9
Control		
2016-17	946.8±19.35 (195)	1.9
2017-18	871.4±10.58 (349)	2.2

Production traits

The production traits were recorded up to 52 weeks of age (Table 43, 44 and 45). The body weight of PB-1, PB-2 and Control lines at 20 weeks of age were 2445±9.59 (1126), 2319±12.1 (706) and 2417±15.45 (178) g, respectively. There was decrease in body weight of PB-1 at 20 weeks of age still it is beyond optimum recommended level for female. Centre needs to implement feed restriction program in a better way in maintaining the required body weight at 20 weeks of age.

Table 43. Adult body weight in PB-2, PB-1 and Control lines

Gen./ year	Body weight (g)	
	20 wks	40 wks
PB-1		
S-9	2510±11.45 (1137)	2818±11.66 (885)
S-10	2445±9.59 (1126)	3049±12.01 (893)
PB-2		
S-41	2298 ±7.92 (1127)	2603±9.36 (979)
S-42	2319 ±12.1 (706)	2886±11.7 (628)
Control		
2016-17	2127±36.68 (88)	3287±46.24 (56)
2017-18	2417 ±15.45 (178)	3277±22.75 (153)

The age at sexual maturity decreased in PB-1, PB-2 and Control lines as compared to previous generation. The egg weight at 36 weeks of age increased in PB-1 and PB-2 lines as compared to previous generation. Egg weight at 52 weeks increased in PB-1 and PB-2 line. There was appreciable increase in the egg production up to 52 weeks of age in PB-1 line as compared to last generation.

Table 44. ASM and egg weights performance at different ages

Gen./ year	ASM (d)	Egg weight (g)	
		36 wks	52 wks
PB-1			
S-9	181.34±0.41 (1013)	51.50±0.15 (835)	63.77±0.35 (209)
S-10	168.15±0.51 (1043)	56.56±0.12 (840)	64.16±0.27 (240)
PB-2			
S-41	163.45±1.08 (340)	47.61±0.37 (128)	53.54±0.20 (76)
S-42	157.26±0.82 (701)	51.31±0.22 (422)	58.73±0.38 (188)
Control			
2016-17	201.50±3.83 (74)	49.04±0.50 (57)	-
2017-18	186.44±1.79 (152)	47.46±0.37 (112)	58.49±0.70 (30)

Table 45. Egg production performance at 40 and 52 weeks of age

Gen./ year	Egg Production (No.)	
	40 wks	52 wks
PB-1		
S-9	48.48±0.61 (1033)	100.10±1.18 (372)
S-10	58.43±0.72 (1043)	111.43±1.48 (350)
PB-2		
S-41	75.98±1.10(335)	116.50 ±1.75 (303)
S-42	68.43±0.87 (350)	103.51 ±0.85 (150)
Control		
2016-17	38.12±1.19 (74)	-
2017-18	41.50±1.79 (158)	55.11±2.33 (152)

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 46. The egg quality traits need to be measured at 32 weeks of age instead of 36 weeks.

Table 46. Mean and SE for egg quality traits at 36 weeks of age

Egg quality traits	Strains		
	PB-1	PB-2	Control
Egg weight (g)	54.59±0.70	57.92±0.67	57.99±1.13
Shape Index	75.5±0.52	74.25±0.53	75.40±0.65
Albumen height (mm)	8.62±0.19	8.15±0.22	9.24±0.24
Yolk height (mm)	16.65±0.12	17.79±0.12	17.19±0.15
Shell thickness(mm)	34.17±0.59	36.86±0.49	38.67±0.38

Genetic parameters

The heritability estimates for 5 week body weight remained static up to 2016-17 and lower estimates are obtained in the present generation as compared to previous generation (Table 47). Similar trend was also observed for egg production up to 40 weeks of age.

Table 47. Heritability estimates in PB-2

Traits	Heritability (2016-17)	Heritability (2017-18)
BW 5	0.13±0.04	0.02±0.04
BW 20	0.11±0.05	0.03±0.06
ASM	0.08±0.02	0.01±0.08
EW 36	0.07±0.03	0.04±0.14
EP 40	0.13±0.07	0.05±0.11
EP 52	0.09±0.05	0.05±0.05

Genetic and phenotypic response

The phenotypic and genetic response for 5 week body weight is presented in Table-48. The phenotypic and genetic response over last 11 generations at 5 week body weight was -3.73 and 11.9g in PB-2 population. The phenotypic response of egg production up to 40 weeks of age was -1.06 egg and genetic response was 2.22 egg over 11 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 11 generations at 5 week body weight was 10.04 and 22.09 g in PB-1. The phenotypic responses of egg production up to 40 weeks of age was -1.92 egg and genetic response was 1.86 egg over 10 generations (Fig 6,7,8 and 9).

Table 48. Genetic and phenotypic response to 5th week body weight and 40th week egg production in PB-1 and PB-2

Trait	PB-1		PB-2	
	Phenotypic response	Genetic response	Phenotypic response	Genetic response
BW 5 wks (g)	10.04	22.09	-3.73	11.94
EP 40 (eggs)	-1.92	1.86	-1.06	2.22

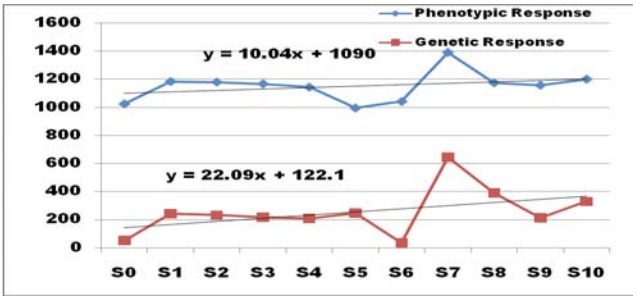

Fig.6. Genetic and phenotypic response to 5 week body weight in PB-1 at Ludhiana

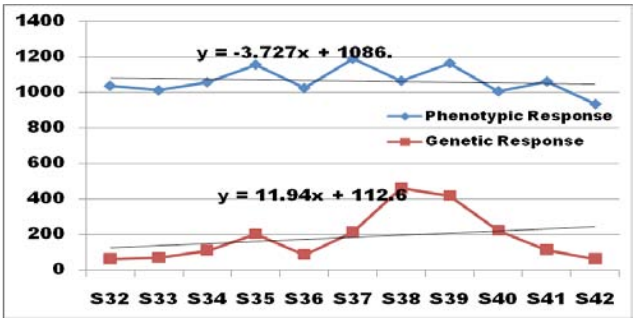

Fig.7. Genetic and phenotypic response to 5 week body weight in PB-2 at Ludhiana

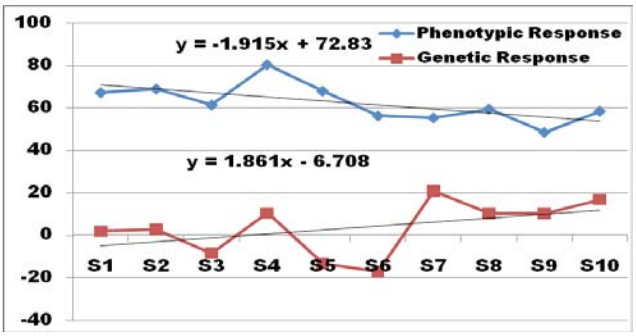

Fig.8. Genetic and phenotypic response to EP40 in PB-1 at Ludhiana

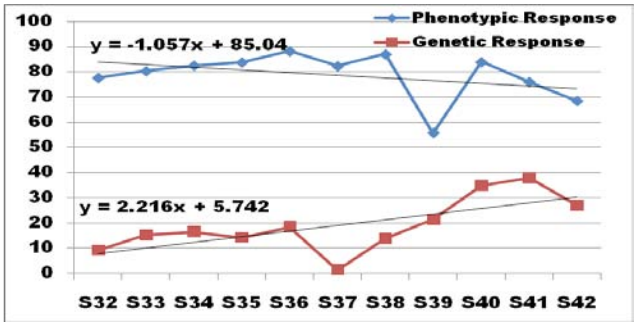

Fig.9. Genetic and phenotypic response to EP40 in PB-2 at Ludhiana

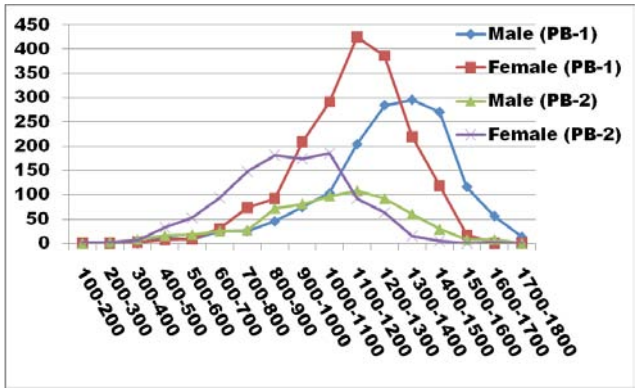

Fig.10. Frequency distribution of 5-week body weight in PB-1 male and female lines and PB-2 male and female lines.

Frequency distribution of 5 week body weight

Frequency distribution of 5-week body weight (frequency on Y axis and body weight on X axis) (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.

Germplasm

A total of 68,829 germplasms (64,413 day old chicks and 4,416 adult birds) were supplied to 170 beneficiaries.

Receipts

During the year 2017-18, the centre generated a revenue of Rs. 16.96 lakhs which is 105.33% of expenditure on feed (Rs. 16.10 lakhs)

ICAR-Central Avian Research Institute, Izatnagar

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 environmental trends.

Action taken during the year 2017-18

- Eggs procured from villages were hatched and were reared till adult stage and filtered for phenotypic characters
- S2 generation of the chicks hatched and 744 good chicks were housed.
- The body weights at different age and confirmatory parameters were recorded
- During the year 2017-18 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.

Details of the implementation of programme and results achieved

S2 generation of the chicks hatched and 744 good chicks were housed. The body weights and confirmatory traits were recorded on 2, 4 and 6 weeks of age. The Desi X Desi and Desi X CSML crosses were obtained and different parameters were recorded. Native chicken with coloured plumage and similar phenotypic characters were retained. Juvenile traits of S-16 generation and production traits of S-15 generation in CSFL and CSML were recorded. A total of 1180 and 1170 good chicks of CSML and CSFL were produced during first hatch. The fertility was 82.72% and hatchability on TES and FES were 75.68 and 91.87%, respectively in CSML. In Control line, a total of 520 eggs were set out of which 404 good chicks were hatched in two hatches with fertility of 86.92% and hatchability based on TES and FES were obtained as 78.65 and 90.49%.

Collection, conservation and evaluation of native germplasm

Out of total 1011 eggs set, 744 good chicks in S-2 generation with fertility and hatchability (TES) of 85.36 and 74.18%, respectively were produced. The body weight of local native chicken germplasm at day old, 2, 4 and 6 weeks were 38.4±0.42 (125), 124.3±2.29 (121), 291.0±5.37 (116) and 543.9±16.30 (114) g, respectively. Shank length and breast angle in Local Desi birds at 6 weeks of age were 5.71±0.14 cm and 30.14±0.09°, respectively. The mortality up to 5 weeks was 3.45% and 6-20 weeks period was 9.79% in desi chicken.

The Desi X Desi and Desi X CSML crosses were obtained and different parameters were recorded. The body weights at 0 day, 2, 4, and 6 weeks of ages in Desi, CSMLX Desi and CSML are presented in Table 49.

Table 49: Body weights and conformation traits at different ages in Desi birds

Trait	Desi x Desi	CSML x Desi	CSML x CSML
Body weight (g)			
0 day	38.4±0.42 (125)	35.86±0.33 (130)	40.76±0.31 (130)
2 wks	124.3±2.29 (121)	152.7±2.49 (122)	-
4 wks	291.0±5.37 (116)	420.5±8.12 (120)	-
6 wks	543.9±16.30 (114)	794.2±14.39 (118)	1396±83.14 (121)
SL (cm)	5.71±0.14	6.64±0. 08	6.88±0.9
B.A (°)	30.14±0.09	38.30±0. 06	43.4±0.07
FCR (0-5 wks)	1.96	1.90	1.70
(0-6 wks)	2.05	2.03	1.78

Conservation and utilization of elite germplasm

Selection records

Over last two generations the selection records for CSML and CSFL were summarized in Table 50. The present generation was reproduced utilizing 51 sires and 306 dams in CSML and 51 sires and 306 dams in CSFL. The effective number decreased in both CSML and CSFL. The number of dam used were less as per the technical programme in both the lines.

Incubation information

The incubation records for the CSML, CSFL and the control lines were presented in Table 51. The fertility remained above 85% in both the selected populations.

Table 50. Summary of selection records for two generations in CSML and CSFL

Particulars	CSML		CSFL	
	2016-17 (S-15)	2017-18 (S-16)	2016-17 (S-15)	2017-18 (S-16)
Sires	55	51	60	51
Dams	330	306	360	306
Sires contributed	50	46	56	46
Dams contributed	300	276	336	276
Effective number	171.43	157.71	192.00	157.71
Rate of Inbreeding	0.0029	0.0032	0.0026	0.0032
Average selection differential	170.06	-	148.66	-
Average Effective selection differential	296.63	-	276.23	-
Selection intensity (σ)	1.81	-	1.39	-

Table 51. Summary of incubation and hatching results during last two generations

Gen.	Eggs set (Nos.)	Fertility (%)	Good Chicks	Hatchability %	
				TES	FES
CSML					
S-14	1087	88.22	-	81.87	92.80
S-15	5000	85.56	3815	77.26	90.30
S-16*	1180	82.72	883	75.68	91.87
CSFL					
S-14	1308	91.67	-	85.09	92.82
S-15	5287	88.99	4208	80.99	91.01
S-16*	1170	86.58	941	81.88	94.57
Control					
S-14	940	86.48	-	75.95	87.82
S-15	946	84.92	696	74.72	87.26
S-16*	520	86.92	404	78.65	90.49

** Data of first Hatch only*

Mortality

The mortality up to 5 weeks of age increased in the current year as compared to previous one and is well within recommended limits across three lines (Table 52). Need to control mortality in CSML and CSFL in 6-20 week age group to bring within recommended level.

Table 52. Mortality (%) records for last two years

Generation	0-5 wks	6-20 wks
CSML		
S-14	4.87	10.40
S-15	5.70	11.34
CSFL		
S-14	4.30	9.56
S-15	4.56	9.03
Control		
S-14	1.57	1.47
S-15	5.69	6.68

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 53.

Table 53. Body weight and FCR at 5 weeks during the last two generations

Generation	5 weeks	
	Body weight (g)	FCR
CSML		
S-14	1210±4.84 (3250)	2.1
S-15	1222±4.65 (650)	2.12
S-16	NC	NC
CSFL		
S-14	1196±1.95 (3000)	2.15
S-15	1209±1.95 (650)	2.02
S-16	NC	NC
Control		
S-15	756.7±7.45 (310)	2.25
S-16	754.4±10.48 (375)	NC

The body weight at 5 weeks of age in CSML, CSFL and control lines recorded in the year 2016-17 (S-15) were 1222±4.65 (650), 1209±1.95 (650) and 756±7.45 (310) g, respectively. The body at 5 week increased in CSML and CSFL as compared to previous generation. The FCR at 5 week of age in CSML, CSFL and control was 2.12, 2.02 and 2.25, respectively. Recording of body weights of S-16 generation is in progress.

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 54). Egg weight at 40 weeks was not recorded in present generation. The 40 week egg production increased in CSML and control as compared to previous generation (Table 55).

Table 54. 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-14	2470 ± 19.07	2355 ± 12.31	2308 ± 11.02	177.25	176.57	175.45
S-15	2445 ± 14.13	2402 ± 9.28	2295 ± 12.13	176.58	176.98	178.45

Egg quality traits

Egg quality traits were measured in CSML and CSFL at 48 weeks of age (Table 56).

Response

Genetic response over last 10 generations of CSML and CSFL is presented in Fig-5 and 6. The phenotypic response per generation was 15.96 and 15.85 g in CSML and CSFL, respectively. The genetic response was 14.34 and 14.19 g, respectively, in CSML and CSFL lines in last 10 generations (Table 57).

Table 56. Egg quality traits at 48 weeks CSML & CSFL during 2017-2018 (S-15)

Traits	CSML (48 wks)	CSFL (48 wks)
Egg weight (g)	61.18±0.70	60.76±0. 73
Egg length (mm)	57.88±0.44	56.95±0.40
Shape index	75.46±0.62	74.47±0.60
Albumen height (mm)	8.39±0.16	8.25±0.18
Yolk height (mm)	19.18±0.13	18.50±0.13
Yolk index (height/width)	0.43±0.01	0.43±0.01
Egg shell thickness (mm)	0.35±0.01	0.33±0.01
Haugh unit	90.86 ±0.83	90.01 ±1.02

Table 57. Phenotypic and genetic response at 5 week body weight

Trait	CSML		CSFL	
	Phenotypic response	Genetic response	Phenotypic response	Genetic response
5 weeks body weight (g)	15.96	14.34	15.85	14.19

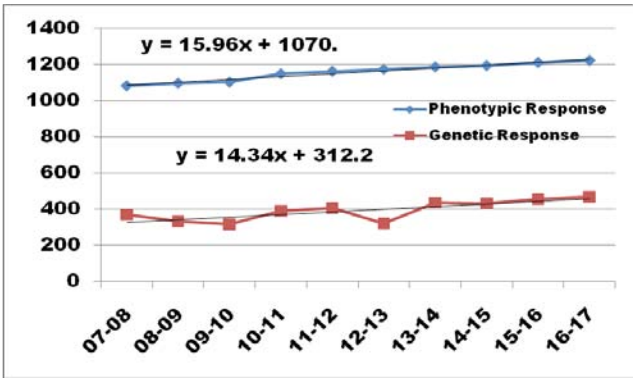

Fig. 11. Genetic and phenotypic response to 5 wks body weight in CSML at Izatnagar

Table 55. 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-13	65.24	66.96	-	65.4	65.8	55.03	105.44	106.74	54.23
S-14	62.14	67.07	-	66.5	66.68	54.23	105.5	106.8	91.2
S-15	-	-	-	67.8	67.67	55.45	-	-	-

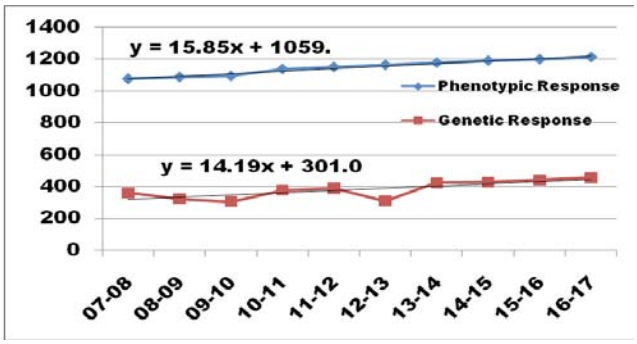

Fig. 12. Genetic and phenotypic response to 5 wks body weight in CSFL at Izatnagar

Random Sample Poultry Performance Test

Centre participated in 48th RSPPT, Gurgaon.

Germplasm supply

A total 88,685 germplasm was supplied to the farmers and other stakeholders during the current year.

Orissa University of Agriculture and Technology, Bhubaneswar

Programme activity assigned

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

Action taken during the year 2017-18

- Native *Hansli* chicken population has been registered with ICAR-NBAGR with Accession Number INDIA_CHICKEN_1500_*HANSLI*_12018.
- Data recording of S-2 generation of *Hansli* chicken was initiated for evaluation of body weight, egg weight, egg production, ASM and mortality.
- The evaluation of CSML X *Hansli* and *Hansli* X CSML crosses are in progress
- During the period S-6 generation of CSFL and CSML were raised and evaluated for juvenile traits.
- During the current year S-5 generation of CSFL and CSML lines were evaluated for production traits.

Details of the implementation of the programme and results achieved

Centre completed the purification of local indigenous chicken and *Hansli* registered as recognized chicken breed. The body weight of indigenous germplasm (S-2) at day old and 8 weeks was recorded. During the current year, production traits of CSFL, CSML and Control lines were evaluated for S-5 generation. The S-6 generations of CSFL and CSML along with control lines were regenerated and evaluated for juvenile traits. The evaluation of CSML X *Hansli* and *Hansli* X CSML crosses are in progress

Collection, Conservation and Evaluation of native germplasm

A total of 1148 good chicks of S-2 generation of *Hansli* chicken germplasm was hatched. The fertility reported was 84.05% which was more than the previous generation (Table 58). The hatchability on TES and FES basis were 74.17 and 88.31%, respectively, which have shown improvement as compared to previous generation. The mortality in S-1 generation at 0-8, 9-20 and 21-40 weeks were 4.89, 0.17 and 4.76%, respectively. The mortality percent in 0-8 week age group of S-2 is 4.70% which is well within the prescribed level. The average body weight at day one and 8week was 30.29±0.05 (1148) and 556.6±5.15 (1094)g. The egg production up to 40 week in S-1 generation was 20.19. The egg weight at 32 and 40 week was 40.18±0.22 (172) and 43.78±0.49 (172). The evaluation of CSML X *Hansli* and *Hansli* X CSML crosses are in progress. Body weight at day old and at 5 weeks of age in CSML X *Hansli* was 30.44 and 548.8 g, respectively (Table 59). Corresponding body weights of *Hansli* X CSML was 40.20 and 566.25 g, respectively.

Table 58. Performance of *Hansli*

Traits	S1	S2
Body weight (g)		
Day old	30.45±0.05 (1389)	30.29±0.05 (1148)
8 wks	552.10±12.21 (1317)	556.59±5.15 (1094)
20 wks	1517.65±18.78	-
40 wks	2931.62±57.42	-
Egg weight (g)		
32 Wks	40.18±0.22	-
40 Wks	43.78±0.19	-
Egg production (Nos.)		
40 wks	20.18	-
52 wks	32.09	-
Fertility %	81.52	84.05
Hatchability (TES) %	67.84	74.17
Hatchability (FES) %	83.15	88.31

Table 59. Performance of crosses G1

Strain	0 BW (g)	5BW (g)	Mortality up to 5 wk (%)	FCR 5th week	20 BW (g) Male	20 BW (g) Female
CSML X *Hansli*	30.44 (109)	548.77	1.83	2.13	2.79	2.12
Hansli X CSML	40.20 (100)	566.25	2.00	1.97	3.35	248

Table 60. Summary of selection records of CSFL and CSML (S- 3) generation

Sl. No.	Particulars	CSFL		CSML	
	Generation	S-5	S-6	S-5	S-6
1	Sires	46	70	47	70
2	Dams	364	350	376	350
3	Sires contributed	46	69	45	68
4	Dams contributed	360	346	368	347
5	Effective number	163.15	230.11	160.38	227.43
6	Rate of inbreeding	0.003	0.002	0.003	0.002
7	Expected selection differential for males (5BW), g	184.14	237.85	165.51	152.80
8	Expected selection differential for females (5BW)	110.33	191.70	80.93	95.29
9	Average expected selection differential, g	147.23	214.78	123.22	124.05
10	Effective selection differential for males, g	143.16	155.18	142.35	143.18
11	Effective selection differential for females, g	112.67	124.31	121.78	117.08
12	Average effective selection differential, g	127.91	139.75	132.07	130.13
13	Selection Intensity	1.06 M 0.95 F	1.16 M 1.04 F	1.16 M 0.81 F	0.76 M 0.52 F

Conservation and utilization of elite germplasm

A total of 70 sires and 350 dams were used in both CSFL and CSML to reproduce the S-6 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 60.

Incubation records

The overall fertility in CSFL and CSML was 93.76 and 89.51%, it has increased in all the lines as compared to previous generation. The hatchability on total and fertile egg set basis in the current generation was similar as the previous generation in CSFL and CSML. The summary of incubation records is presented in Table 61.

Table 61. Incubation records for CSFL, CSML and control line

Gen.	Eggs set (Nos.)	Fertility (%)	Good chicks	Hatchability (%)	
				TES	FES
CSFL					
S-5	4272	90.15	3448	82.15	91.13
S-6	2772	93.76	2280	82.87	88.38
CSML					
S-5	4473	90.54	3159	82.98	91.63
S-6	3142	89.51	2303	73.17	81.69
Control					
S-5	630	79.21	300	50.95	64.32
S-6	210	89.52	162	79.04	88.29

Mortality

The mortality during 0-5 weeks in CSFL and CSML line was 4.52 and 4.84%, respectively. The mortality was well within recommended level in the current generation. Mortality records are presented in Table 62.

Table 62. Mortality (%) at different ages

Gen.	Age in wks		
	0-5	6-20	21-40
CSFL			
S-5	4.91	1.16	4.48
S-6	4.52	NC	NC
CSML			
S-5	5.06	1.67	3.99
S-6	4.84	NC	NC
Control			
S-5	6.33	NR	NR
S_6	4.22	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 1006±4.21 (2177) and 1105±4.29 (2162) g, respectively during current generation and remained static in CSFL and CSML. 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 63.

Table 63. Body weight, FCR and conformation traits in CSFL, CSML and control

Generation	BW5 (g)	FCR	BA (degree)	SL (mm)	KL (mm)
CSFL					
S-5	1009±4.29 (2457)	1.93	52.16±1.01 (2457)	81.4±0.5 (2457)	91.6±0.5 (2457)
S-6	1006±4.21 (2177)	1.89	51.88±0.08 (2177)	80.1±0.2 (2177)	89.4±0.2 (2177)
CSML					
S-5	1112±6.18 (2700)	1.90	51.31±0.35 (2700)	81.8±0.9 (2700)	91.8±0.6 (2700)
S-6	1105±4.29 (2162)	1.93	51.35±0.09 (2162)	81.9±0.2 (2162)	92.1±0.2 (2162)
Control					
S-5	769.7±14.88 (271)	1.91	47.97±0.91 (271)	79.2±0.5 (271)	89.9±0.7 (271)
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-5) in CSFL (183 d) and CSML (182 d) maintained as compared to previous generation (S-4). Twenty week and 40 week body weights in CSFL and CSML are presented in Table 64.

Table 64. Body weight at 20 and 40 week in CSFL, CSML and Control

Gen.	ASM (d)	20 BW (g)	40 BW (g)
CSFL			
S-4	182	2302±14.67 (300)	3048±64.48 (300)
S-5	183	2370±15.34 (300)	3025± 42.09 (300)
CSML			
S-4	184	2479±21.11 (300)	3227±30.29 (300)
S-5	182	2460±26.29 (300)	3234±33.45 (300)
Control			
S-4	NR	2125±15.25 (100)	3142±17.89 (100)
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 64.78 and 61.55. EP40 has increased in both the lines. Egg production up to 52 week increased in CSFL as well as CSML. Centre did not report these traits in Control population. 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 65.

Table 65. Egg weight and egg production in CSFL and CSML lines

Gen.	EW 32 (g)	EW 40 (g)	40 wks HDEP	52 wks HDEP
CSFL				
S-4	52.54±0.34	56.98±0.79	64.32	109.17
S-5	52.78±0.29	56.17±0.72	64.78	110.11
CSML				
S-4	52.96±0.32	55.22±0.47	61.39	107.23
S-5	53.08±0.33	55.74±0.44	61.55	108.19
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 66.

Table 66. Egg quality traits at 52 weeks of CSFL and CSML for S-4 and S-5 generations.

Egg quality traits	CSFL		CSML	
	S-4	S-5	S-4	S-5
Egg weight (g)	59.21 ± 0.85	58.91 ± 0.81	58.11 ± 0.54	58.43 ± 0.49
Shape index (%)	74.33 ± 0.41	74.09 ± 0.35	71.31 ± 0.49	71.87 ± 0.52
Shell Thickness (mm)	0.377 ± 0.04	0.342 ± 0.04	0.422 ± 0.04	0.417 ± 0.04
Albumin index	0.082 ± 0.005	0.079 ± 0.005	0.073 ± 0.006	0.079 ± 0.006
Yolk index	0.471 ± 0.004	0.452 ± 0.004	0.495 ± 0.002	0.481 ± 0.002
Haugh unit	76.29 ± 2.24	75.88 ± 2.19	81.29 ± 1.63	80.59 ± 1.57

Response to selection

The phenotypic response of CSML and CSFL over four generations were 74.13and 45.51 g, respectively for 5 week body weight. The genetic response in respective lines were 64.37 and 35.75 g (Table 67)

Table 67. Phenotypic and Genetic response in primary and correlated traits

Trait	Phenotypic	Genetic
Body weight at 5 wks (g)- CSML	74.13	64.37
Body weight at 5 wks (g)- CSFL	45.51	35.75

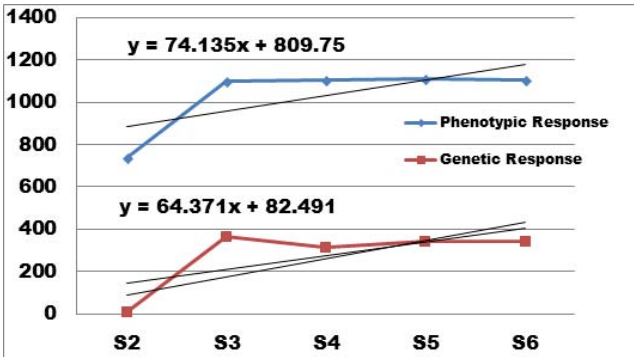

Fig.13. Genetic and Phenotypic response to 5 wks body weight in CSML at Bhubaneswar

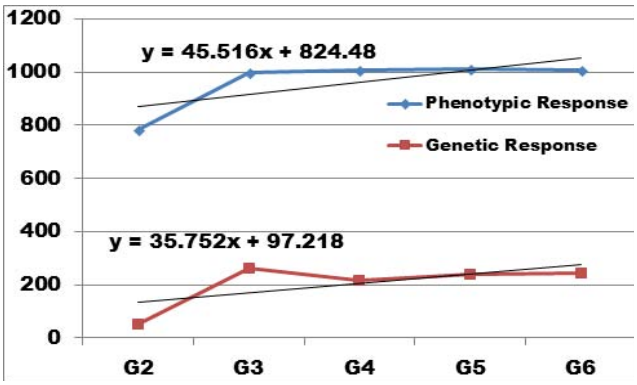

Fig.14. Genetic and Phenotypic response to 5 wks body weight in CSFL at Bhubaneswar

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 1500g. Frequency distribution of 5th week body weight of CSML and CSFL is given in Fig1.

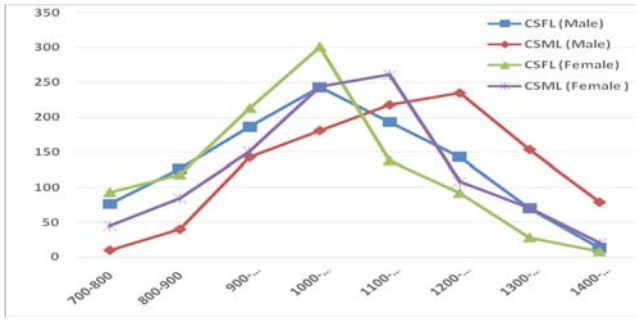

Fig .15. Frequency distribution at 5 week body weight of CSML and CSFL (Male and Female)

Body weight of cross

Front Line Demonstrations to evaluate the performance of cross (CSML X CSFL) has been conducted in 3 different districts of the state. The mean 7th week body weight, FCR and mortality were recorded as 2152 g, 2.12 and 0.67% respectively.

Germplasm

This centre supplied a total of 31,685 germplasm to the farmers.

Receipts

During the year 2017-18, the centre generated revenue of Rs. 8.76 lakhs which is 50.78% of expenditure on feed.

ICAR Research Complex for NEH Region, Agartala

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, and BN cross.
- Three way cross was evaluated in E-2 generation.
- Performance of dual variety chicken (BND Cross) was evaluated at institute farm as well as the farmer's field's conditions.

Details of the implementation of programme and results achieved

During the period under report, the centre hatched 4144 good chicks of Tripura black and evaluated up to 20 weeks of age. The *Dahlem Red* was evaluated up to 20 weeks of age using 2253 chicks. Three way cross was also evaluated from 20- 72 weeks in E-2 generation.

Incubation and hatching

The percent fertility ranged from 74.75 to 81.42% (Table 68). The fertility improved in all the populations as compared to previous generation except in Tripura Black and CSFL crosses. The hatchability on total eggs set (76.89 to 81.69%) improved in all the lines as compared to previous generation.

Mortality

The mortality during brooding period was lowest in Tripura black (4.30%) and *Dahlem Red* populations (4.70%). During growing period the mortality was very comparatively lower in 0-5 weeks compared to previous generation. Mortality during growing period ranged from 3.10 – 9.55% and during laying period it ranged from 2.80 -9.10% (Table 69).

Performance of pure lines and crosses

The body weight at 8 weeks was 316.4, 544.2, 1044.8 and 550.2 g in Tripura Black, *Dahlem Red*, coloured broiler dam line and BN cross, respectively (Table 70). The 20 week body weight was 1105, 1720, 3240 and 1590 g in Tripura Black, *Dahlem Red*, coloured broiler dam line and BN cross, respectively. During E-2 evaluation the 72 week egg production was 141 and 119 eggs under farm and field conditions, respectively in BND cross (Table 71).

Table 68. Summary of incubation and hatching of different populations

Strains	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks hatched (Nos.)
				TES	FES	
Tripura Black	2016-17	1688	80.50	61.84	76.82	1044
	2017-18	**6915**	**74.95**	**79.37**	**59.49**	**4114**
CSFL	2016-17	177	85.87	64.97	75.60	115
	2017-18	**10493**	**81.42**	**79.16**	**64.46**	**6764**
Dahlem Red	2016-17	1882	75.34	56.96	75.59	1072
	2017-18	**3641**	**80.47**	**76.89**	**61.87**	**2253**
BN cross (50%)	2016-17	3797	54.41	45.95	84.46	1745
	2017-18	**3300**	**75.48**	**81.69**	**61.66**	**2035**
BND cross (Dual type)	2016-17	13325	77.41	62.19	80.33	8287
	2017-18	**12486**	**76.31**	**78.31**	**59.77**	**7463**

Table 69. Mortality (%) at different ages

Strain	Year	0-5wks	6-20wks	20-40wks	41-72wks
Tripura Black	2016-17	10.99	7.52	2.53	2.27
	2017-18	4.30	9.32	9.10	9.0
DR	2016-17	10.00	11.71	3.34	2.47
	2017-18	4.7	5.1	6.4	6.5
BN cross	2016-17	3.72	9.88	2.89	-
	2017-18	5.9	9.55	4.8	5.1
BND cross	2016-17	7.00	13.18	9.25	6.76
	2017-18	5.82	3.10	2.80	2.90

Table 70. 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	31.10 ± 0.60	37.80±0.45	45.20 ±0.42	36.85±0.38
4 wks	155.9± 3.89	225.2±8.00	436.6±10.77	219.5±8.15
8 wks	316.4± 8.30	544.2±16.12	1044±32.16	550.1±18.60
20 wks	1105±24.52	1720± 33.22	3240±60.82	1590 ± 41.55
40 wks	1571±96.24	2125±158.44	3403±119.37	2339±121.51
ASM (d)	176	158	165	169
Egg wt 40 wks (g)	38.89±.57	53.18±.61	59.57±.67	50.89±1.01
Egg Production (Nos.)				
40 wks	38.10	61.50	35.48	36.30
52 wks	70.93	111.45	63.58	66.24

Table 71. Performances of BND cross

Traits	Dual Type (BND cross) (E-1)		Dual Type (BND cross) (E-2)	
Body weight (g)	**Farm**	**Field**	**Farm**	**Field**
Day old	41.39±0.62	40.05 ± 0.35	39.40±0.50	-
4 wks	243.6±8.34	239.9 ± 13.27	236.6±8.45	-
8 wks	547.0±17.04	433.4± 16.64	565.0±15.04	503.0± 21.75
20 wks	1806±54.46	1455 ± 23.58	1756±55.36	1595 ± 87.06
40 wks	2653±82.26	2078 ± 24.56	2220±49.46	1857±27.51
ASM (d)	165	174	160±1.22	172.±0.59
EW 40 wks (g)	55.88 ± 0.39	50.12	53.20±0.87	48.11±0.27
Egg Production (Nos.)				
40 wks	46.15	-	50.24±1.10	40.84±0.53
52 wks	82.50	-	89.90± 1.15	74.05±0.54
72 wks	121.56	98.72	141.03±1.73	119.01 ±0.71

Training programme

A total of six 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 354 tribal farmers were trained on all aspects of poultry farming like general care and management, breeds and breeding management, formulation of balance ration using locally available cheap feed ingredients, disease and health management were covered. Poultry Science division of ICAR Research Complex, Lembucherra, West Tripura, organized four awareness programmes with tribal farmers (147 nos.) at different villages of Tripura.

Germplasm

A total of 20,913 germplasms (20,913 chicks) were supplied to 501 beneficiaries The centre need to improve the germ plasm supply.

Receipt realized

The centre realized overall receipt of Rs. 10.54 lakhs which was 48.88% of the expenditure on feed cost (Rs. 21.56 lakhs).

Nanaji Deshmukh Veterinary Science University, Jabalpur

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
- Evaluation of new variety *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-**7** generation of *Kadaknath* (Kd) and Jabalpur colour populations up to 56 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.

Details of the implementation of programme and results achieved

The G-8 generation of *Kadaknath* and Jabalpur Colour populations were evaluated up to 52 weeks of age. *Narmadanidhi* (25% Kd. 75% Jabalpur colour) birds were evaluated in farm and field up to 52 weeks of age. The centre also evaluated CSFL up to 40 weeks of age.

Selection records

The Jabalpur colour (JBC) population (G-8) was reproduced utilizing 54 sires and 324 dams and *Kadaknath* population (G-8) was reproduced utilizing 54 sires and 324 dams (Table 72). The average effective selection differential was 11.52 and 12.48 in JBC and *Kadaknath* populations and corresponding selection intensity was 0.31 and 0.46 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 except in CSFL population as compared to previous generation. The hatchability on total eggs set reduced in Jabalpur colour and CSFL, whereas, it increased in *Kadaknath* (Table 73).

Table 72. Summary of selection record of Jabalpur colour and *Kadaknath* (G-8)

Particulars	Jabalpur colour	Kadaknath
Sires	54	54
Dams	324	324
Sires contributed	54	54
Dams contributed	324	324
Effective number	185	185
Rate of inbreeding	0.003	0.003
Expected sel. Differential for male (g)	14.16	16.70
Expected sel. differential for female (g)	12.24	14.32
Average sel. differential expected (g)	13.20	15.51
Effective sel. differential for male (g)	13.40	14.03
Effective sel. differential for female (g)	9.64	10.93
Average sel. differential Effective (g)	11.52	12.48
Selection intensity	0.31	0.46

Mortality

In G-8 generation, during brooding period the mortality ranged between 4.60 and 7.48% in all the populations and decreased when compared to last generation (Table 74). The mortality ranged between 4.71 - 6.91% 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-8 generation, the 6 week body weight was 397 and 827g in *Kadaknath* and Jabalpur colour population, respectively. The egg weight at 40 weeks of age was 58.7g in Jabalpur colour and 47.8 g in *Kadaknath*, respectively. The hen housed egg production up to 40 weeks of age was 88.90 eggs in JBL population and 54.60 eggs in *Kadaknath* population. In CSFL 40 week egg weight and production were 60.10g and 62.0 eggs, respectively (Table 75).

Table 73. Incubation information of different populations

Strain	Generation	Fertility (%)	Chicks hatched (No.)	Hatchability (%)	
				TES	FES
Jabalpur colour line	G-7	80.35	2449	62.17	77.38
	G-8	82.98	3453	63.32	76.31
Kadaknath	G-7	86.19	1645	66.22	76.83
	G-8	87.12	2144	63.17	72.51
CSFL	2016-17	90.08	252	75.87	84.23
	2017-18	80.32	169	54.52	67.87

Table 74. Mortality (%) at different ages in last 2 generations

Strain	Generation	0 – 6 wks	7 – 18 wks	19 – 40 wks
Kadaknath	G-7	5.2	6.6	4.1
	G- 8	4.60	5.26	3.70
Jabalpur colour line	G-7	8.3	7.2	3.2
	G-8	7.48	5.74	2.88
CSFL	2016-17	9.1	6.1	5.9
	2017-18	7.74	6.91	3.70
***Kadaknath* Crosses**	2016-17	5.6	5.1	5.55
	2017-18	4.35	4.71	4.16
M-1	2016-17	8.1	5.8	4.5
	2017-18	7.92	5.73	3.92
M-2	2016-17	7.0	6.5	3.7
	2017-18	5.14	5.41	3.44

Table 75. Performance of growth and production traits in pure lines

Traits	Kadaknath (G-8)		JBC (G-8)		CSML
	N	Farm	N	Farm	Farm
BW 6 wks (g)	1488	397.2±9.3	2746	827.3±6.2	1021±6.8 *
BW 20 wks **(g)**	540	1135±16.2	972	1785±20.3	2107±23.5
BW 40 wks **(g)**	427	1530±17.3	631	2067±19.5	2330 ±19.5
ASM (d)		165		150	179
EW 28 wks **(g)**		40.7±0.05		49.8±0.19	-
EW 40 wks **(g)**		47.8±0.07		58.7±0.15	60.1 ±1.1
EP 40 wks **(No.)**					
HH		54.6		88.9	62.0±1.6
HD		58.2		93.6	-
Survivor		56.7		90.1	-
EP 52 wks **(No.)**	324		540		
HH		81.5		152.3	-
HD		85.1		156.5	-
Survivor		83.3		153.7	-

*5 wks body weight

Table 76. Performance of growth and production traits in *Narmadanidhi* during 2017-18.

Traits	Farm	Field
BW 8 wks (g)		
M	1153±16.5	812.2±20.3
F	823.7±11.5	656.7±17.6
BW 20 wks (g)		
M	1960±22.4	1602±11.4
F	1630±16.5	1321±14.8
BW 40 wks (g)		
M	2510±17.9	2430±21.5
F	1770±21.6	1624±25.3
ASM (d)	169	-
EW 40 wks (g)	49.5	47-48g
EP 40 wks **(No.)**	66±2.7	44±1.6
EP 52 wks **(No.)**	-	85.2±6.8
EP 72 wks **(No.)**	-	168±5.1

Narmadanidhi, dual type chicken having 25% Kd: 75% JBP colour inheritance was evaluated under farm and field conditions. This variety produced 66 eggs up to 40 weeks of age in farm conditions. This cross produced 44, 85.2 and 168 eggs up to 40, 52 and 72 weeks, respectively in field conditions (Table 76). The egg production reduced both at 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.

Germplasm

A total of 51,851 germ plasms (20,796 chicks, growers, pullets and 31,055 hatching eggs) were supplied to 217 beneficiaries.

Receipt realized

The centre realized overall receipt of Rs.14.46 lakhs which was 73.5% of the expenditure on feed (19.97 lakhs).

Assam Agricultural University, Guwahati

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 new variety *Kamrupa* in different agro climatic conditions.

Action Taken

- A total of 781 numbers of indigenous adult male and female of 12 months of age are kept in the farm and their performances are under evaluation.
- A flock of 536 nos. of crossbred (PB-2 x Indigenous) birds have been maintained in the centre and their performance is studied up to 52 weeks
- The performance of 1006 nos. of *Dahlem Red* birds evaluated.
- A flock of 591 nos. of *Kamrupa* have been kept in the centre which is of 12 months age and their performance is evaluated in the farm and field condition up to 52 weeks.

Details of the implementation of programme and results achieved

A total of 781 numbers of indigenous adult male and female of 12 months of age are kept in the farm and their performance was evaluated. The performance of a flock of 130 PB-2 male procured from the DPR, Hyderabad is also studied up to 52 weeks. A flock of 536 nos. of BN crossbred (PB-2 x Indigenous) have been maintained in the centre and their performance was studied. The performance of 1006 *Dahlem Red* birds procured from DPR, Hyderabad is evaluated up to 52 weeks. A flock of 591 nos. of *Kamrupa* have been kept in the centre of 12 months age and their performance is evaluated in the farm and field condition up to 52 weeks.

Incubation records

Summary of incubation records has been presented in Table 77. The average fertility of all the flocks was found to be 87.67%. The hatchability on total eggs set ranged from 50.26 to 81.56%. Fertility and hatchability of three germplasm was better compared to previous year.

Mortality

The mortality during the current year is presented in Table 78. The mortality during brooding and growing period was under acceptable limit except from BND cross. However it was higher than previous year. The mortality during laying period (41-52 weeks of age) was higher in all pure and crossbred germplasm. The higher mortality was due to outbreak of suspected very virulent viral diseases other than Ranikhet and IBD.

Table 78. Mortality (%) at different periods (wks)

Strain	Year	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
PB-2	2016-17	2.30	0.78	0.79	0.80
	2017-18	4.61	4.03	1.68	0.00
Dahlem Red	2016-17	3.42	2.00	0.55	0.15
	2017-18	3.67	2.42	0.48	3.73
BN cross	2016-17	1.09	0.33	0.11	Nil
	2017-18	2.56	1.18	0.17	6.29
BND cross	2016-17	2.95	1.70	0.54	0.10
	2017-18	6.16	9.96	4.17	14.22

Table 77. Summary of incubation and hatching

Strain	Year	Eggs set (No.)	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Indigenous	2016-17	2385	76.98	60.92	79.14	1453
	2017-18	520	77.12	61.73	80.05	321
BN cross	2016-17	1895	63.43	48.28	76.12	915
	2017-18	384	63.54	50.26	79.10	193
BND cross	2016-17	32895	78.01	70.40	90.24	23,156
	2017-18	34192	88.10	81.56	92.57	27887

Performance evaluation of germplasm

The juvenile and production traits in indigenous, PB-2 and *Dahlem Red* are presented in Table 79. The 5 weeks body weight was 126.6 g in indigenous, 1035 g in PB-2 and 350.2 g in *Dahlem Red*. The ASM was lesser in *Dahlem Red* (162.1 days) as compared to native chickens (176.3 days). In native population, the egg weight and egg production up to 52 weeks was 39.25 g and 66.85 eggs respectively. In *Dahlem Red* egg production improved by 2 eggs.

Performance of crosses

The five week body weight was 260.2 g and FCR was 3.15 in BN cross. The age at sexual maturity was 169.2 days and remained almost similar as compared to previous generation. The hen housed egg production up to 52 weeks was 71.20 eggs. Almost all the parameters are same as compared to previous generation (Table 80).

The *Kamrupa* variety was evaluated up to 52 weeks in farm and field conditions during the current year. The 5 weeks body weight was 230.6 g and 185.4 g in the farm and field, respectively. The age at sexual maturity was 151.3 days in the farm and 171.1 days in the field. The egg weight at 40 weeks of age was 54.20 and 40.80 g, respectively in farm and field. The hen housed egg production up to 40 weeks and 52 weeks of age was 48.30 and 88.90 eggs respectively in the farm and corresponding values in the field were 42.80 and 72.90 eggs, respectively. The performance of cross was slightly improved over last two generations (Table 81).

Germplasm supply

The centre supplied 28,057 (1,320 hatching eggs and 26,737 chicks of *Kamrupa*) germplasm to farmers.

Revenue generation

The centre realized receipt of Rs. 7.41 lakhs during the financial year which is 58.39 % of expenditure on feed cost (Rs.12.69 lakhs). The centre needs to improve both supply of germplasm and revenue generation.

Table 79. Juvenile and production traits in pure lines

Traits	Indigenous		PB-2		Dahlem Red	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g)						
Day old	620	31.70 ± 2.8	120	44.25 ± 3.8	520	37.10 ± 2.5
5 wks	580	126.6 ± 7.2	105	1035 ± 80.5	490	350.2 ± 51.6
20 wks	550	1091 ± 85.2	90	2581± 195.6	450	1220 ± 98.3
40 wks	500	1580± 110.6	70	3521± 390.6	390	1690 ± 285.8
Conformation traits at 5 week of age						
Shank length (mm)	580	47.20 ± 2.25	105	75.90 ± 5.10	490	60.20 ± 2.65
Keel length (mm)	580	50.25 ± 2.60	105	86.70 ± 7.20	490	52.60 ± 2.30
Breast Angle (o)	580	56.50 ± 4.10	105	71.60 ± 3.90	490	63.90 ± 6.35
FCR up to 5 wks	580	3.27	105	2.71	490	2.62
ASM (d)	310	176.3 ± 5.8	-		350	162.1 ± 7.2
Egg wt (g) at						
32 wks	275	35.80 ± 2.40	-		300	48.20 ± 4.50
40 wks	250	36.50 ± 3.25	-		270	58.30 ± 6.30
52 wks	230	39.25 ± 4.10	-		240	60.20 ± 5.60
EP (No.) 40 wks						
Hen housed	310	37.80	-		350	62.20
Hen day	-	39.10	-		-	63.90
Survivor	270	39.80	-		290	64.80
EP (No.) 52 wks						
Hen housed	310	66.85	-		350	116.20
Hen day	-	68.40	-		-	117.90
Survivor	240	70.20	-		240	118.60

Table 80. Juvenile and production performance of two way cross

Traits		BN cross at Farm	
		N	Mean ± SE
Body weight (g)	Day old	430	34.2 ± 6.2
	5 wks	410	260.2 ± 25.8
	20 wks	370	1650 ± 150.3
	40 wks	345	2480 ± 315.2
Conformation traits at 5 wks of age			
	Shank length (mm)	410	50.40 ± 3.90
	Keel length (mm)	410	51.60 ± 7.20
	Breast Angle (o)	410	65.80 ± 7.20
FCR up to 5 wks		410	3.15
ASM (d)		200	169.2 ± 6.10
Egg wt (g) at 32 week		190	45.10 ± 2.85
	40 week	170	47.50 ± 6.60
	52 week	150	57.30 ± 4.60
E.P. (No.) 40 wks Hen housed		200	38.40
	Hen day	-	39.60
	Survivor	170	41.20
E.P. (No.) 52 wks Hen housed		200	71.20
	Hen day	-	72.30
	Survivor	155	73.50

Table 81. Juvenile and production performance of three way cross BND (*Kamrupa*)

Traits		Field		Farm	
		N	Mean ± SE	N	Mean ± SE
Body weight (g)	Day old	380	36.20 ± 2.9	580	36.20 ± 2.90
	5 wks	360	185.4 ± 6.8	550	230.6 ± 51.2
	20 wks	330	950 ± 90.2	530	1150 ± 170.6
	40 wks	280	1511 ± 290	500	2010 ± 390
Conformation traits at 5 wks of age					
	Shank length (mm)	360	48.30 ± 2.65	550	47.20 ± 2.90
	Keel length (mm)	360	52.30 ± 6.20	550	48.30 ± 6.20
	Breast Angle (o)	360	50.80 ± 5.20	550	65.90 ± 7.30
FCR up to 5 wks		360	-	550	2.73
ASM (d)		150	171.1 ± 5.90	260	151.30± 5.30
Egg weight (g) at 32 wks		240	39.20 ± 2.40	260	49.80 ± 4.60
	40 wks	210	40.80 ± 5.60	240	54.20 ± 2.60
	52 wks	200	42.30 ± 6.50	230	56.30 ± 4.10
E.P. (No.) 40 wks Hen housed		150	42.80	260	48.30
	Hen day	-	43.65	-	49.50
	Survivor	130	44.80	240	51.60
E.P. (No.) 52 wks Hen housed		150	72.90	260	88.90
	Hen day	-	73.80	-	90.30
	Survivor	120	75.10	210	92.60

Birsa Agricultural University, Ranchi

Programme activity assigned

- Genetic improvement of native chicken for body weight as well as egg production may be practised for brining faster genetic gain in the terminal crosses.
- 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.
- The centre will work on development of new varieties suitable for rural poultry in the region utilizing local germplasm.

Action taken

- The centre evaluated G6 generation of native population up to 52 weeks of age.
- The half sib mating for pedigree record was conducted and 300 chicks of native were produced and evaluated up to 20 weeks for body weight.
- The half sib pedigree was recorded up to 20 weeks of age. Accordingly male parent (Sire) will be selected.
- The *Dahlem Red* G5 generation was evaluated up to 64 weeks of age.
- BN cross E5 was evaluated up to 64 weeks of age.
- *Jharsim* birds E5 evaluated up to 64 weeks and E6 up to 20 weeks of age. *Jharsim* birds were distributed among the farmers and one success story was published on ICAR website.
- As directed in last AICRP Annual review meeting to conduct survey in the study area to determining the choice of farmers for the type of birds to be developed. The results of survey revealed that first choice of farmer was dual type, second egg type and third was meat type (detail survey report will be submitted).
- Centre has consulted with state biodiversity board regarding the approval of new variety developed *Jharsim* and report will be submitted.

Details of the implementation of programme and results achieved

- The centre evaluated G-6 generation of native population up to 52 weeks of age.
- The centre has selected males from desi population for half sib mating under pedigree record
- The *Dahlem Red* (G-5) was evaluated from 64 weeks of age
- The layers of BN cross E4 was evaluated up to 64 weeks of age
- E-6 of Jharsim (DBN cross) was evaluated up to 64 weeks in farm conditions.

Incubation records

The fertility ranged from 86.93 to 94.54% in all the lines during current year (Table 82). The fertility improved marginally in all the lines as compared to previous generation. The hatchability on total eggs set ranged from 68.11 to 78.57% and it improved marginally in all the populations. In the current year, hatchability on fertile eggs set ranged from 78.35 to

Table 82. Summary of incubation and hatching

Strains	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Native	2016-17	505	82.37	65.14	79.08	329
	2017-18	**505**	**86.93**	**68.11**	**78.35**	**344**
Dahlem Red	2016-17	710	88.59	69.15	78.06	491
	2017-18	-	-	-	-	-
BND	2016-17	705	90.35	70.49	78.02	497
	2017-18	-	-	-	-	-
Jharsim(DBN)	2016-17	5880	95.32	78.19	82.03	4598
	2017-18	**13380**	**94.54**	**78.57**	**83.08**	**10514**
BN Cross	2016-17	140	90.71	70.71	77.95	99
	2017-18	-	-	-	-	-

83.08 % in all the lines. Centre should take all possible steps to improve the hatchability. The centre should hatch sufficient number of chicks in native germplasm as per technical program.

Mortality

Mortality during brooding period though reduced, it was on higher side and ranged from 3.24 -7.33% (Table 83).

Table 83. Mortality (%) at different weeks

Breeds/ strains	Year	0-6	7-18	19-40
Native	2016-17	6.34	5.25	5.54
	2017-18	5.22	4.82	4.34
Dahlem Red	2016-17	5.11	6.32	4.38
	2017-18	5.46	4.92	3.89
PB2	2016-17	3.45	2.76	4.47
	2017-18	-	-	3.52
BN Cross	2016-17	2.13	3.48	2.36
	2017-18	3.24	4.02	2.82
BN x D Cross	2016-17	9.28	6.65	5.53
	2017-18	-	-	-
Jharsim (DBN)	2016-17	8.45	5.49	4.47
	2017-18	7.33	4.95	5.21

Mortality during growing stage was also slightly on higher side ranging from 4.02- 4.95%. During laying period mortality ranged from 2.82-5.21%. The centre has to take all the necessary precautions to contain mortality at all stages in all the lines.

Performance evaluation of germplasm

In native population, production traits were evaluated from 52 weeks of age during G-6 generation (Table 84). The hen housed egg production up to 52 weeks was 52.89 and hen day was 56.81 eggs in native population. In *Dahlem Red*, the hen housed egg production up to 64 weeks was 161.05 and hen day egg production was 166.42 eggs in G-5 generation. In BN cross (E-5) hen housed egg production up to 64 weeks of age was 92.73 and hen day was 98.81 eggs.

In three way crosses, 4, 8 and 20 week body weights were better in Jharsim (DNB) cross during E6 generation (Table 85). The hen housed egg production up to 64 weeks of age was more in Jharsim (DBN) (142.4 eggs) than BND cross (93.2 eggs) during E5 evaluation under farm conditions.

Germplasm supply

Centre supplied 21,235 (6,847 hatching eggs and 14,388 chicks) germplasm to the farmers and increased compared to previous year. The centre should improve germplasm supply.

Receipt realized

The centre realized a receipt of Rs. 9.70 lakhs during the financial year which is 64.66% of expenditure on feed cost (Rs. 15.00 lakhs).

Table 84. Performance of different breeds/strains

Traits		Native (G-6)	*Dahlem Red* (G-5)	BN Cross (E-5)
Year		2016-17	2016-17	-
Body weight (g)	Day old	32.08±0.24	-	28.02±0.16
	4 wks	175.8±1.77	-	180.2±1.38
	8 wks	490±3.48	-	506±5.29
	12 wks	753±3.57	-	707±5.45
	16 wks	1138±5.36	-	925±6.30
	20 wks M	1553±10.19	1724±7.43	1324±13.37
	F	1368±11.73	1515±4.16	1102±6.21
ASM (d)		178	159	157
EP 40 wks (No.)	HD	30.83	45.07	33.69
	HH	28.17	43.62	32.66
EP 52 wks (No.)	HD	56.81	99.42	71.64
	HH	52.89	96.21	68.33
EP 64 wks (No.)	HD	-	166.42	98.81
	HH	-	161.05	92.73

Table 85. Performance of three way crosses in the farm

Traits	BND (E-5)	Jharsim - DBN (E-6)
Body weight (g)		
Day old	30.03±0.41	29.70±0.19
4 wks	180.07±1.63	183.42±1.11
8 wks	507.32±8.23	535.26±4.488
12 wks	722.87±8.08	839.24±5.04
16 wks	1043.56±11.42	1148.97±5.35
20 wks		
M	1511.93±12.38	1477.26±8.04
F	1208.13±13.85	1314.06±6.32
ASM (d)	172	171
Egg Production (No.)		
40 wks		
HD	34.72	41.17
HH	33.04	39.29
52 wks		
HD	67.39	96.98
HH	63.04	89.52
64 wks		
HD	93.17	142.36
HH	87.16	131.41

Maharana Pratap University of Agriculture & Technology, Udaipur

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

- G-7 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 E6.
- *Pratapdhan* (E7) 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* a dual purpose variety was supplied to the needy farmers.

Details of the implementation of programme and results achieved

Incubation records

The centre regenerated G-8 generation of Mewari chicken population as well as RIR, CSFL BN and BNR populations. The fertility ranged from 78.44 – 92.97% in all the populations (Table 86). The fertility increased in all populations in this year. The hatchability on total eggs and fertile set also increased in all populations. Overall, there was improvement in the performance with respect to incubation records such as fertility and hatchability from the centre in this year.

Mortality

The Mortality in various populations is presented in Table 87. The mortality was on higher side (6.60 to 11.76) in all the populations during juvenile period. During growing period as well the mortality was on higher side (7.89 to 16.53) in all the populations. The mortality in general is on higher side and the centre needs to take all possible measures to keep mortality under control.

Table 86. 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	2015-16 (G-6)	4960	79.91	62.74	78.51	3127
	2016-17 (G-7)	3918	75.27	57.08	75.84	2210
	2017-18 (G-8)	**5123**	**78.44**	**67.70**	**86.37**	**3462**
RIR (Anand)	2015-16	7350	84.51	70.37	83.19	5210
	2017-18	**4200**	**91.52**	**79.40**	**86.75**	**3335**
CSFL	2015-16	420	78.81	58.10	73.36	244
	2016-17	420	87.85	72.62	82.66	305
	2017-18	**420**	**92.97**	**79.76**	**85.90**	**335**
BN cross	2015-16	3898	84.71	75.81	89.49	2957
	2016-17	4513	72.73	64.20	88.23	2893
	2017-18	**9203**	**76.54**	**67.31**	**87.88**	**6143**
Pratapdhan	2015-16	1,00,769	80.36	69.25	86.03	70,509
	2016-17	1,10,842	79.21	63.44	77.85	70,318
	2017-18	**98246**	**84.80**	**73.04**	**86.03**	**72450**

Table 87. Mortality (%) records at different age in different populations

Strain/breed/ cross	Gen./Year	0-5 wks	6-20 wks	21-40 wks	41- 52 wks
Mewari	G-5	10.37	14.65	23.42	14.47
	G-6	10.26	13.86	8.44	10.61
	G-7	11.76	13.24	9.32	2.50
RIR	G-4	2.76	7.63	15.10	-
	G-5	7.41	8.19	10.66	5.24
	G-6	-	-	-	-
	G-7	10.28	16.53	23.67	6.75
CSFL	2015-16	5.65	17.79	3.85	-
	2016-17	8.07	3.90	3.55	2.11
	2017-18	7.00	7.89	10.00	8.33
BN cross	2015-16	5.58	7.65	10.31	-
	2016-17	10.74	9.65	5.82	2.11
	2017-18	6.60	10.30	9.47	7.16
Pratapdhan (BNR cross)	2015-16	4.67	9.44	10.29	6.90
	2016-17	7.75	7.59	5.57	-
	2017-18	6.75	8.26	15.70	6.96

Table 88. Growth and production performance of Mewari in different generations

Traits	Mewari (G-5)		Mewari (G-6)		Mewari (G-7)	
	N	Mean±SE	N	Mean±SE	N	Mean±SE
Body weight (g) 0 day	1483	31.5±0.12	2257	31.67±0.15	2339	31.36± 0.1
8 wks	668	652±4.33	1115	633±2.50	-	630±3.21
20 wks*	439	1412±17.53	660	1327±7.41	868	1436±9.40
40 wks	377	1615±16.43	597	1474±9.46	370	1670±21.53
ASM (d)		174.7		171.6		159.31
Egg weight (g)						
28 wks	270	41.86±0.14	249	41.26±0.20	401	42,36 ± 0.16
40 wks	296	45.98±0.12	336	45.24±0.20	280	46.19 ± 0.18
EP 40 wks (no)						
HH	296	28.81	336	30.35		28.94
HD		46.92		44.89		41.26
Survivor		49.32		50.37		107.32
EP 52 wks (no)						
HH		39.96		38.88		37.26
HD		70.58		65.07		67.34
Survivor		104.79		64.52		138.18
EP 72 wks (no)						
HH		54.92		-		-
HD		92.92		-		-

*Data from 20 weeks of age are for female before 20 weeks in pooled sex

Performance evaluation of germplasm

In Mewari population the juvenile body weights at 8 weeks marginally reduced during G-7 generation as compared to G-6 generation (Table 88). However, 20 weeks and 40 weeks body weight increased by 109 g and 196 g in G-7 generation as compared to G-6 generation. The age at sexual maturity has decreased by 12.3 days as compared to previous (G-6) generation. The hen housed egg production up to 52 weeks of age decreased by 1.62 eggs while hen day egg production increased by 2.27 eggs. However, surprisingly survivors' egg production at same age has increased by whopping 138.18 eggs. Centre needs to provide explanation for such wide ranging variation in egg production traits.

Evaluation of *Pratapdhan*

E-6 generation of *Pratapdhan* was evaluated from 28 to 72 weeks of age while E-7 generation was evaluated up to 20 weeks of age (Table 89). There was no change in egg weight recorded at 40 weeks of age in the present generation. However, hen housed hen day and survivors egg production up to 40 weeks of age decreased drastically by 15.69, 13 and 50.06 eggs in the E6 evaluation as compared to previous generation. Similarly, hen housed, hen day and survivors egg production up to 52 weeks of age decreased by 1.91, 0.99 and 54.03 eggs in the E6 evaluation as compared to previous E5 evaluation. The hen day egg production up to 72 weeks of age decreased by 3.39 eggs while hen housed egg production increased by 3.91 eggs in E-6 evaluation as compared to E-5 evaluation. Body weight of *Pratapdhan* at 8 weeks of age has increased by 316 g. Centre needs to take care of sever reduction egg production up to 40 and 52 weeks of age and look in to the inconsistency in hen housed egg production up to 72 weeks of age in the present generation.

Germplasm supply

A total of 83471 germplasm was supplied during the current year.

Revenue generation

The centre realized a receipt of Rs. 20.33 lakhs during the current financial year which is 95.23% of expenditure on feed cost (i.e. Rs 21,35,090).

Table 89. Performance of growth and production traits in *Pratapdhan*

Traits		*Pratapdhan*			
		E-4	**E-5**	**E-6**	**E-7**
Body weight (g)	day old	39.32±0.17	40.31±0.11	38.23±0.19	39.02 ± 0.13
	2 wks	173.0±1.91	169.7±1.16	126.6±0.58	147.69 ± 1.10
	4 wks	314.01±4.06	326.35±2.56	295.1±2.18	378.11 ± 3.47
	8 wks	682.7±8.26	693.4±5.31	646.7±8.09	963 ± 11.94
	20 wks*	1796±26.50	1721±21.71	1911±27.61	1927 ± 15.70
	40 wks	2032±30.44	2036±25.84	-	
AFE (d)		133	127	138	-
ASM (d)		151.3±1.41	144.5±0.55	157.6±0.78	-
Egg wt. (g)	28 wks	47.06±0.19	47.13±0.18	47.74±0.22	-
	40 wks	52.85±0.13	53.79±0.11	53.13±0.31	-
EP 40 wk (no.)	HD	51.24	80.86	65.17	-
	HH	38.08	62.91	49.91	-
	Survivor	82.50	122.90	72.84	-
EP 52 wk (no.)	HD	86.41	105.01	103.1	-
	HH	55.17	75.59	74.6	-
	Survivor	119.54	171.33	117.3	-
EP 72 wk (no.)	HD	159.12	170.89	167.5	-
	HH	80.15	96.29	100.2	-

*Values for females only from 20 weeks onward before 20 weeks in pooled sex.

CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur

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 birds with improved germplasm.
- The centre will work on development of new varieties suitable for rural poultry in the region utilizing local native germplasm.

Action taken

- The centre released the location specific dual purpose poultry variety *Himsamridhi* suitable for backyard poultry farming in hilly areas.
- In native germplasm, G-5 generation was evaluated up to 52 weeks.
- The *Dahlem Red* population evaluated (G-5) up to 34 weeks and G-4 generation completed evaluation from 52-72 weeks of age.
- The *Dahlem Red* X Native cross birds were produced and evaluated up to 26 weeks of age
- The chicks of DNXD cross (*Himsamridhi*) have been produced and evaluated on farm up to 14 weeks and in the field up to 28 weeks for growth parameters.
- DNXD cross (*Himsamridhi*) birds from previous year completed evaluation from 40-72 weeks at farm and 40-52 weeks under field conditions.
- The centre organized the Annual Review Meet of AICRP on Poultry Breeding and PSP during 24th -25th May 2017.

Details of the implementation of programme and results achieved

Native germplasm

A total of 7207 native chicks (G6 generation) were produced at hatchery by collecting fertile eggs from farm. Crosses such as DN and DNXD were produced and their evaluation is in progress up to different ages.

Improved germplasm

The G5 germplasm of *Dahlem Red* population was under evaluation up to 34 weeks of age and G4 generation from previous year completed evaluation from 52-72 weeks of age.

Incubation records

The summary of incubation records for various pure lines and crosses is presented in Table 90. The fertility was good and ranged between 70.18% for DNXD / *Himsamridhi* to 94.23% for DXN cross. Fertility improved in *Dahlem Red* and DN cross. However, it declined drastically in native and DND cross this year as compared to previous generation. The hatchability ranged from 49.89% to 84.49% on TES and 71.09% to 89.66% on FES basis. Hatchability improved over previous year in all the populations. The hatchability was comparatively lower in DND population (49.89% and 71.09% on TES and FES basis) compared to overall average of 55.74% on TES and 74.22% on FES. Although hatchability increased over previous year but fertility needs improvement.

Table:90. Summary of incubation and hatching

Strain/ cross	Year	Egg set	Fertility (%)	Hatchability (%)		No. of good chicks
				TES	FES	
Native	2016-17	9790	85.17	57.89	67.96	5668
	2017-18	13199	76.80	54.60	71.55	7207
Dahlem Red	2016-17	916	64.41	18.23	28.30	167
	2017-18	3484	83.18	62.05	74.60	2162
DN cross	2016-17	8438	87.22	66.81	76.60	5638
	2017-18	2619	94.23	84.49	89.66	2213
DNXD cross	2016-17	50724	81.33	54.10	66.51	27443
	2017-18	29261	70.18	49.89	71.09	14600

Mortality

The chick mortality (0-6 weeks) was high ranging from 10.6 to 21.9% (Table 91) during this year. The mortality remained high during 6-20-weeks of age ranging from 11.5 to 22.5%. The mortality during 21-40 weeks ranged from 4.0-10.4% in different stocks/ populations. Most of the mortality was due to non-specific causes like chilling, overcrowding / huddling and killing by rodents. The centre is taking necessary precautions to reduce the mortality at all ages in coming times including necessary bio-security measures.

Table 91. Mortality at different ages

Strain/ cross	Year	Mortality (%)		
		0-6 wks	7-20 wks	21-40 wks
Dahlem Red (DR)	2016-17	3.12	4.36	10.40
	2017-18	10.63	11.51	10.50
Native	2016-17	11.72	20.95	3.20
	2017-18	21.52	13.92	9.31
DN cross	2016-17	13.20	4.14	3.84
	2017-18	21.86	22.47	12.26
DNXD cross	2016-17	18.71	12.79	5.00
	2017-18	24.69	4.59	4.04

Performance evaluation of germplasm

The performances of *Dahlem Red*, Native, DRXN and DN x D (*Himsamridhi*) populations were evaluated (Table 92). There was not much change in body weight recorded at different age in native chicken. However, in *Dahlem Red* breed body weight has come down in this generation. The egg weight for *Dahlem Red* and Native eggs was similar to previous generation. Egg production up to 40 and 52 weeks of age in Native chicken has improved as compared to previous generation. DRXN population is still under evaluation for egg production till the end of reporting period.

Evaluation of DNXD (Himsamridhi)

The DNXD cross (*Himsamridhi)* was evaluated under farm and field conditions up to 72 weeks of age (Table 93). The hen housed egg production of DNXD cross (*Himsamridhi)* under farm evaluation showed an improvement of 5.42 egg over previous generation. The field performance of the stock showed HHEP of 81.62 eggs up to 52 weeks from the stocks supplied during previous year.

Table 92. Mean and Standard Errors for body weights and production traits

Traits	DR (G-4)		Native (G-5)		DR X N	
	N	Mean ±SE	N	Mean ±SE	N	Mean ± SE
Body Weight (g)						
Day old	914	36.93±0.33	302	30.62±0.18	279	35.25±
4 wks	853	237.3±2.7	256	185.3±1.1	246	0.2230.5±6.2
20 wks	344	1465±19.7	89	1420±20.2	169	1510±15.4
40 wks	-	-	80	1515±15.7	-	-
FCR (0-4 wks)	853	2.93	256	3.77	246	3.03
Age at 50% HHEP	342	179	80	181		
Egg Weight (g)						
28 wks	100	50.02± 0.20	100	40.20±0.10	-	-
40 wks	-	-	100	44.95±0.20	-	-
EP 40 wks (No.)						
HH	-	-	89	43.29	-	-
HD			86	44.75		
Survivors'			83	46.42		
EP 52 wks (No.)						
HH	-	-	89	79.83	-	-
HD			84	84.58		
Survivors'			81	87.71		
EP 72 wks (No.)		(Pre. year stock)				
HH	878	141.94	-	-	-	-
HD	728	175.04				
Survivors'	577	215.99				

Table 93. Mean and Standard Errors for body weights and production trait in DND crosses at farm and field level

Traits	DNXD (*Himsamridhi*)			
	Farm		Field	
	N	Mean ± SE	N	Mean ± SE
Body Weight (g)				
Day old	577	36.89±0.34	570	36.89±0.34
4 wks	466	198.8±2.16	313	190.1±3.80
20 wks	194	1476±13.04	140	1443±19.52
40 wks	-	-		-
FCR (0-4 wks)	466	3.39		-
Age at 50% HHEP	185	185	95	212
Egg Weight (g)				
28 wks	50	50.85± 0.25	35	48.57±0.41
40 wks	50	53.66± 0.22		
Egg Production				
EP 40 wks (No.)				
HH	194	58.94		Under evaluation
HD	183	61.48		
Survivors	178	62.95		
EP 52 wks (No.)				(Previous year stock)
HH	194	90.85	101	81.62
HD	183	97.15	85	96.98
Survivors	176	99.53		
EP 72 wks (No.)				
HH	194	153.99		
HD	174	171.84		
Survivors	155	180.86		

Germplasm supply

During the year, the centre supplied 29,617 chicks of *Himsamridhi/* DNXD cross, Native and other crosses to farmers (316 farm units).

Revenue generation

The centre realised receipts of Rs. 11.13 lakhs during the financial year on account of sale of various poultry products (chicks, eggs, culled birds) which is 59.42% of expenditure on feed cost (Rs. 18.73 lakhs). Centre needs to improve the germplasm supply and revenue generation.

ICAR - Directorate of Poultry Research, Hyderabad

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 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

The layer control was maintained as random bred population for 13 generation without any significant variation in important economic traits. The present generation was produced with 50 sires and 200 dams in pedigreed random mating. 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-13 generation

The number of sires and dams used to regenerate LC-13 generation, effective population size and rate of inbreeding are presented in Table 1. The effective population size for LC-13 was 200 and inbreeding coefficient was 0.0025 (Table 94).

Incubation records

Incubation records of LC-13 generation in layer control population are presented in Table 95. Fertility, hatchability on total eggs set and hatchability on fertile eggs set respectively were 59.2, 47.8 and 80.7%. Fertility and hatchability on TES decreased in the current generation as compared to previous generation.

Table 94. Number of sires and dams, effective population size and rate of inbreeding over generation

Gen.	No. of Sires	No. of Dams	Effective population size (Ne)	Rate of inbreeding (ΔF)
LC-7	40	200	200.00	0.00250
LC-8	40	200	200.00	0.00250
LC-9	32	128	157.54	0.00488
LC-10	37	74	169.14	0.00507
LC-11	50	200	246.15	0.00313
LC-12	50	200	160.00	0.003
LC-13	40	200	200.00	0.00250

Table 95. 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

Production Performance

During the year 2017-18, the birds of LC-13 generation were evaluated up to 40 weeks of age. The performance of control population and their regression value (time trend of control) has been presented in the following Table 96. 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-12) showed non-significant change and the control population appears to be stable for all the traits for last eleven generations.

II) Maintenance and Evaluation of Random-Bred Control Population for Meat

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

Table 96. Performance of layer control population for growth and production traits

Gen.	Body weight (g)		ASM (d)	Egg weight 40 wks (g)	Egg production (No.)	
	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	-
b ± S.E	-23.14^{NS} ± 8.12	1.01^{NS} ± 3.29	0.21^{NS} ± 0.64	-0.02^{NS} ± 0.21	2.57^{NS} ±0.83	9.08 ± 2.76

Incubation records

Incubation records of G-16 generation in broiler control population have been presented in Table 97. Percent fertility, percent hatchability on total eggs set and percent hatchability on fertile eggs set respectively were 78.99, 71.93and 91.06. Both fertility and hatchability were improved in the current generation as compared to previous generation.

Table 97. Incubation records Broiler control population

Gen.	Fertility (%)	Hatchability (%)	
		TES	FES
G-15	73.68	63.65	89.10
G-16	78.99	71.93	91.06

Juvenile body weights

Performance of juvenile traits in control broiler population over 16 generation is presented in Table 98.During the current generation body weight at 5weeks and 6weeks respectively were 734g and 951g. 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.

Table 98. Performance of juvenile body weights in broiler control population

Generation	5 wks	6 wks
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
b±S.E	-18.83^{NS}±6.33	-17.18^{NS} ±8.42

The regression estimates of generation mean on generation number for 5week body weight and 6week body weight showed non significant changes over generations indicating the stability of the broiler control population for juvenile body weights.

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 3. 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 (3). The regression estimates of generation means on generation number (G0 to G-15) showed non-significant changes over the generations in all the traits (Table 99) indicating the stability of the broiler control.

Table 99. Growth and production performance of broiler control population over generations

Gen.	BW 20 (g)	BW 40 (g)	ASM (d)	EW 32 (g)	EW 40 (g)	EP 40 (No)
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 native chicken (S-2) germplasm up to 40 weeks of age and evaluated elite layer lines IWN (S-30) and IWP (S-30) for production traits.
- Hen housed egg production up to 40 weeks of age increased by 3.8 eggs in IWP (124.83) strain whereas it decreased by 2.51 eggs in IWN (120.23) on phenotypic scale as compared to the previous generation.
- IWN X Native (ND) cross was produced and evaluated up to 72 weeks and chicks of ND male with RIR female (NDR) cross have been produced and evaluated in farm and field condition up to 40 weeks of age.
- The centre has generated revenue of Rs. 53.84 lakhs, which was 218.15% of the total expenditure on feed (Rs. 24.68 lakhs).
- The centre has supplied record number of germplasm (2,16,397) during the year.
- Centre has achieved the target of germplasm supply. The efforts of PI and his team are commendable.

Short fall

- Egg production up to 40 weeks in IWN strain has come down by 2.51 eggs.

AAU, Anand

Accomplishments and achievements

- This centre has evaluated S-1 generation of native birds, RIR breed, F_1 cross (IWN x Native), IWD and IWK (S-6) for production traits up to 40 weeks of age and three way cross (F_1 x RIR) up to 64 weeks of age.
- Egg production up to 40 weeks of age was higher in native chicken (71.3) as compared to RIR (68.5).
- S-14 generation of IWN and IWP strains along with control layer population was evaluated up to 40 weeks of age. Egg production up to 40 weeks of age was higher in IWN (120.7) than IWP (110.4) strain which has improved over previous generation.
- The centre has generated the revenue of Rs. 18.41 lakhs which was 71.62% of the expenditure on feed cost (Rs 25.62 lakhs).
- The centre supplied a total of 49036 number germplasm during the present year.

Short fall

- Very high mortality reported during 17-40 weeks of age in S-1 generation of native chicken and RIR breeds, F1 and terminal (F_1 x RIR) cross exceeded the permitted rate of 1% mortality per month.
- Hatchability declined in native chicken despite having improved fertility compared to previous generation.
- Germplasm supply was less.

Suggestions for further improvement

- Proper biosecurity needs to be maintained in the farm to reduce the mortality. PI is advised to contact the health experts of University/DPR to control the mortality.
- Hatching and incubation conditions needs to be monitored regularly for improving the hatchability.
- Efforts should be made to increase the germplasm supply.

KVAFSU, Bengaluru

Accomplishment

- Evaluated the performance of local (S-1), PB-1 (S-10), PB-2 (S-23) and cross for economic traits.
- Body weight at 8, 12 and 20 weeks of age was 477.8, 785.6 and 1110 g, respectively in local chicken. The average age at sexual maturity was 165.7 days.
- Egg production up to 40 weeks of age in PB-1, PB-2 and Control lines were 57.01, 56.9 and 66.1 eggs, respectively.
- The average phenotypic and genetic response of body weight at 5 week over 11 generations in PB-1 was 14.4 and 24.4g, respectively. Corresponding values in PB-2 at 5 week over 12 generations was 9.25 and 17.08 g, respectively.
- The centre participated in the 47th RSPPT for broilers at Gurgaon, Haryana during 2017-18. The average body weights at 6 and 7 weeks of age were 1692 and 2080 g in Raja - II (PB1 x PB2). The feed efficiency was 1.56 between 0 - 7 weeks. The dressing percentage was 71.5.
- A total of 2,10,086 germplasm were supplied to 397 beneficiaries.

- During the year 2017-18, the centre generated revenue of Rs. 54.98 lakhs which is 168.18 % of expenditure on feed cost (Rs.32.69 lakhs).

Shortfalls

- Body weight at 20 week of age was more than the target body weight in PB-1 and PB-2 lines.

Suggestions

- Effective restricted feeding protocol needs to be followed to maintain the target body weight at 20 weeks.

GADVASU, Ludhiana

Accomplishment

- Evaluated the performance of local, PB-1 (S-10), PB-2 (S-42) and cross for economic traits.
- Body weight of native germplasm at day one, 4 and 8 week was 38.47, 572.1, 737.9 g, respectively.
- Body weight of PB-2 x Desi at 4 weeks was 612.0 g in farm and 359.1 g in field. Egg production up to 40 weeks of PB-2 X Desi was 77.2 eggs.
- Average body weight at 5 weeks of age was 1200, 934.4 and 871.3 g in PB-1, PB-2 and Control lines, respectively.
- Genetic response over last 11 generations for 5 week body weight was 22.09 g in PB-1 and 11.9g in PB-2 population.
- A total of 68,829 germplasm was supplied to 170 beneficiaries.
- During the year 2017-18, the centre generated revenue of Rs.16.96 lakhs which is 105.33% of expenditure on feed cost (Rs.16,10 lakhs).

Shortfalls

- The fertility and hatchability reduced.
- Mortality increased across all age groups.
- Body weight at 20 week of age was more than the target body weight in PB-1 and Control lines.

Suggestions

- Proper monitoring of incubation conditions in the hatchery is essential to improve the hatchability.
- Proper biosecurity needs to be maintained in the farm to reduce the mortality.
- Effective restricted feeding schedule needs to be followed to maintain the target body weight at 20 weeks.

CARI, Izatnagar

Accomplishment

- Evaluated the performance of native, CSML (S-16), CSFL (S-16) and cross for economic traits.
- Body weight of local native chicken germplasm at day old, 2, 4 and 6 weeks were 38.4, 124, 291.0 and 543.9 g, respectively.
- Body weight of CSML x Desi chicks at day old, 2, 4 and 6 weeks week were 35.86, 152.7, 420.5 and 794.2 g, respectively,
- The body weight at 5 weeks increased in CSML and CSFL as compared to previous generation.
- The phenotypic response of body weight at 5 weeks per generation was 15.96 and 15.85 g in CSML and CSFL, respectively. The genetic response was 14.34 and 14.19 g, respectively.
- A total of 43084 germplasm was distributed to 22 beneficiaries. Revenue generation was Rs.35.00 lakhs.

Shortfalls

- Mortality is higher during grower phase.
- 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-2), CSML (S-6), CSFL (S-6) and crosses for economic traits.
- Native *Hansli* chicken population has been registered with ICAR - NBAGR with Accession Number INDIA_CHICKEN_1500_*HANSLI*_12018.
- Body weight at day one and 8 week of *Hansli* was 30.29 and 556.5 g. The egg production up to 40 week in *Hansli* was 20.18 eggs.
- Body weight at day old and at 5 weeks of age in CSML X *Hansli* was 30.44 and 548.77g, respectively. Corresponding body weights of *Hansli* X CSML was 40.20 and 566.25 g, respectively.

- Egg production up to 40 and 52 weeks was 64.7 and 110.1 eggs, respectively in CSFL line.
- Centre has supplied 31,685 day old chicks to farmers.
- The centre has generated revenue of Rs. 8.76 lakhs, which is 50.78 percent of total feed cost.

Shortfalls

- Centre needs to report the egg production performance of Control population to measure the genetic response.
- 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.
- Body weight at 8 and 20 weeks was 316.4, 544.2, 1044 and 550.2 and 1105, 1720, 3240 and 1590 g in Tripura Black, *Dahlem Red*, coloured broiler dam line and BN cross, respectively.
- The 72 week egg production was 141 and 119 eggs under farm and field conditions, respectively, in BND cross.
- A total of 20,913 germplasm was supplied to 501 beneficiaries
- Centre generated revenue of Rs. 10.54 lakhs which is 48.88% of expenditure on feed cost (Rs. 21.56 lakhs).

Shortfalls

- The centre has to speed up the process of development of location specific variety.
- Germplasm supply was low

Suggestions

- PI advised to submit the growth and production data from farm and field of three way cross to the nodal centre.
- Efforts should be made to improve the germplasm supply and revenue.

NDVSU, Jabalpur

Accomplishment

- Evaluated the performance of *Kadaknath* (G-8), Jabalpur Colour (G-8), CSFL and *Narmadanidhi*.
- The 6 week body weight was 397 and 827g in *Kadaknath* and Jabalpur population.
- The hen housed egg production up to 40 weeks of age was 88.90 eggs in JBC and 54.60 eggs in *Kadaknath*.
- *Narmadanidhi* produced 66 eggs up to 40 weeks of age in farm condition. It produced 44, 85.2 and 168 eggs, respectively, up to 40, 52 and 72 weeks in field conditions.
- A total of 51,851 germplasm were supplied to 217 beneficiaries.
- Centre generated revenue of Rs. 14.46 lakhs which is 73.5 % of expenditure on feed cost (19.97 lakhs).

Shortfalls

- The hatchability on total eggs set reduced in all the lines.
- Germplasm supply was low

Suggestions

- Temperature and humidity needs to be monitored during incubation in the hatchery to improve the hatchability.
- Efforts should be made to improve the germplasm supply and revenue.

AAU, Guwahati

Accomplishments and achievements

- Guwahati centre evaluated native, *Dahlem Red* and BN cross and *Kamrupa* up to 52 weeks of age.
- The age at sexual maturity in *Kamrupa* was 151.3 days in the farm and 171.1 days in the field. The hen housed egg production up to 40 and 52 weeks of age was 48.30 and 88.90 eggs in the farm and 42.80 and 72.90 eggs in the field, respectively.
- The centre supplied 28,057 germplasm to farmers.
- The centre realized receipt of Rs. 7.41 lakhs during the financial year which is 58.39% of expenditure on feed cost (Rs.12.69 lakhs).

Short falls

- Higher mortality during 41-52 weeks of age in native chicken and BND cross during 6-20 and 41-52 weeks of age
- Germplasm supply and revenue generation was low.

Suggestions

- Proper biosecurity measures need to be followed to control the mortality. PI advised to contact the health experts of University/DPR to control the mortality.
- Efforts should be made to improve the germplasm supply and reevenue.

BAU, Ranchi

Accomplishments and achievements

- Centre evaluated native, *Dahlem Red*, BN cross and *Jharsim.*
- Egg production up to 40 weeks in native, *Dahlem Red*, BN cross and *Jharsim* was 30.83, 45.07, 33.69 and 41.17 egg, respectively.
- Centre supplied 21,235 germplasm to the farmers. The centre realized a receipt of Rs. 9.70 lakhs during the financial year which is 50.28% of expenditure on feed cost (Rs. 15 lakhs).

Short falls

- Egg production was low in all the lines.
- Field performance of *Jharsim* not provided.
- Germplasm supply and revenue generation was low

Suggestions

- Egg production needs to be improved by monitoring feed quality and lighting management.
- *Jharsim* should be evaluated in field.
- Efforts should be made to improve the germplasm supply and revenue generation

MPUAT, Udaipur

Accomplishments and achievements

- Centre evaluated *Mewari* (G-7), *Pratapdhan (E-7), RIR, CSFL and BN cross* for growth and production traits.
- Egg production up to 40 weeks in *Mewari* and *Pratapdhan* was 67.34 and 65.17 eggs, respectively.
- A total of 83,471 germplasm was supplied.
- The centre realized a receipt of Rs. 20.33 lakhs during the current financial year which is 95.23% of expenditure on feed cost (i.e. Rs 21,35,090).

Short falls

- Mortality was on higher side.

Suggestions

- Proper biosecurity measures need to be followed to control the mortality. PI advised to contact the health experts of University/DPR to control the mortality.

CSKHPKVV, Palampur

Accomplishments and achievements

- The centre released the location specific dual purpose poultry variety *Himsamridhi* suitable for backyard poultry farming in hilly areas.
- Centre evaluated native (G-5), *Dahlem Red* (G-5), *Himsamridhi* and crosses for growth and production traits.
- Egg production up to 40 weeks in native and *Himsamridhi* was 44.75 and 61.48 eggs, respectively.
- A total of 29,617 germplasm supplied.
- The centre generated revenue of Rs. 11.13 lakhs which is 59.42% of expenditure on feed cost (Rs.18.73 lakhs).

Short falls

- Mortality was very high.
- Germplasm supply needs to be improved.

Suggestions

- Proper biosecurity measures need to be followed to control the mortality.
- Efforts should be made to improve the germplasm supply.

Poultry Seed Project

History

India is an agri-based country with more than 65% population living in rural areas, who mainly depends on agriculture and livestock farming for their livelihood. The intensive poultry farming largely depends on expensive inputs like feed ingredients, healthcare products, power and manpower and has grown to an agri-based industry providing employment to 5-6 million people. Therefore, the intensive farming is limited to a few urban pockets in our country, which resulted in wide gap in availability of poultry produce (eggs & chicken meat) between urban and rural areas across the country. The poultry products are available relatively at cheaper price in abundance in production centres and at higher price in rural areas which resulted in wide gap in per capita consumption between urban and rural areas. Logically, there is a great need for protein rich food in the diets of rural population. Majority of rural families in our country consume rice or wheat as staple food, which is rich in energy and low in protein. Therefore, there is a great need for balanced protein for rural population to safe guard their health. Egg and chicken meat are less expensive and can be made readily available to enrich the low protein diets of rural / tribal population by adapting rural poultry farming.

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 lakh 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	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	Tirupati
12	ICAR Research Complex for NEH Region, Umiam, Barapani	Meghalaya

Budget allocation

The council has sanctioned Rs. 1669.50 lakhs, under SFC (2017-2020) plan for poultry seed project which includes non-recurring and recurring expenditure required for implementing the project. Budget allocation for each centre is given below for the year 2017-18 along with revenue receipts.

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 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). 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 for germplasm supply for different Centres

Centre	Target (Nos.)
West Bengal University of Animal and Fishery Sciences, Kolkata	1,00,000
Bihar Animal Sciences University, Patna	50,000
Regional Centre, ICAR Research complex for NEH Region, Jharnapani,	70,000
ICAR-National Organic Farming Research Institute, Gangtok	40,000
Regional Centre, ICAR Research complex for NEH Region, Imphal	60,000
Tamil Nadu Veterinary and Animal Sciences University, Hosur	1,00,000
ICAR-Central Coastal Agricultural Research Institute, Panji, Goa	50, 000
ICAR-Central Island Agricultural Research Institute, Port Blair	50,000
PVNR Telangana Veterinary University, Warangal	50, 000
Sri Venkateswara Veterinary University, Tirupati	50, 000
Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	50,000
ICAR Research Complex for NEH Region, Umiam, Barapani	50,000

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

A layer house with a floor space of 2500 sft completed and is ready for housing parent stock. The roof was embedded with 50 mm polyurethane foam panel in between zinc-aluminium alloy sheet which will reduce the shed temperature significantly for better climate control.

Parent stock

Six batches of *Vanaraja* parents were reared during the year, out of which, four are in laying, one in growing and one in brooding phase. A total of 703 female and 127 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 1980 and 2170 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	400	380
5	600	510
12	1500	1350
20	2170	1980

Egg production

Average age at first lay has been recorded as 175 days (25 weeks) with a range of 157 -212 days across the batches. Average HDEP ranged from 11.5% at 25 weeks to 66.9% at 40 weeks of age (Table 4). The egg production of 50% was achieved at the age of 32 weeks and maintained the rate of production up to 64 weeks, and in between from 36 weeks to 52 weeks of age, more than 60% egg production was recorded (Table 5). Thus, persistency of egg production is good indicating ideal management practices resulting in optimum production from the birds. Average egg weight at 40 and 72 weeks of age was 45.5 and 59.4 g, respectively.

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

Age (wks)	Egg production (HDEP %)	Egg weight (g)
28	38.9	43.5
36	63.2	44.2
40	66.9	45.5
52	60.1	55.8
64	50.0	56.3
72	41.4	59.4

Hatching Performance

Hatching performance of *Vanaraja* parents in terms of fertility and hatchability is presented in Table 5. Fertility ranged from 60.3% (at 25 weeks of age) to 90.8% (at 44 and 48 weeks of age). Hatchability on total eggs set (TES) and fertile eggs set (FES) was consistent throughout the life cycle reaching upto 78.5% (TES) and 87.1% (FES). Fertility and hatchability rates were in optimum range indicating good hatchery practices.

Table 5. Hatching performance of *Vanaraja* parents

Age (wks)	Fertility (%)	Hatchability (%)	
		TES	FES
28	89.9	77.8	86.5
36	89.9	76.6	85.2
40	90.2	78.5	87.1
52	88.3	72.0	81.5
64	87.4	72.6	83.1
72	88.6	65.6	74.1

Germplasm supply

A total of 79,390 day old chicks (DOCs) of *Vanaraja* were distributed to the farmers in various parts of West Bengal during the year 2017-18. Beneficiaries were rural poultry farmers, KVKs (North 24 Parganas KVK, Murshidabad KVK), ICAR institutes (CIFE, Kalyani), SAUs (BCKV, WBUAFS), TSP projects (funded by ICAR) *etc*. The centre has generated total revenue of Rs.11.02 lakhs during the reporting period.

Constraints

- Fund under livestock component is less, which needs to be increased.
- Timely supply of parent stock (both male and female chicks of *Vanaraja*) is to be assured by the DPR, Hyderabad.

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

Three batches (300 male and 1865) 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 6% 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 6. At 20 weeks of age the average body weight of *Vanaraja* male and female lines was 3115.58±62.90 g and 1770.35±40.26 g in batch I and 2820.45±50.36g and 1812.47±45.75g in batch II, respectively. 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. Proper monitoring of feed restriction is required for maintaining the body weight at standard level for optimum production during laying stage.

Table 6. Body weight (g) in *Vanaraja* male and female parents

Age (wks)	Male line	Female line
4	370.3±9.95	369.8±8.31
6	590.1±12.82	720.3±12.06
12	1891±46.44	1165±22.77
16	2352±59.97	1676±36.54
20	3115±62.90	1770±40.26

Egg production

The average age at sexual maturity of three batches was 172 days in *Vanaraja* female parents. The birds attained 10% production at 186 days of age. The HDEP in *Vanaraja* at 40 weeks of age was 51.27% with an egg weight of 51.56 g (Table 7). 50% production attained at 36 weeks of age and maintained till 52 weeks of age. The peak production of 72% attained at 42 weeks of age and continued for 6 weeks of age.

Table 7. Egg production and egg weight in *Vanaraja* parents (% on hen day basis)

Age (wks)	HDEP (%)	Egg weight (g)
28	20.27	48.24
36	51.35	50.38
40	51.72	51.56
52	64.77	56.16

Fertility and Hatchability

The average fertility was 86.58% in *Vanaraja* parents. The average hatchability on TES and FES were 67.06% and 85.54%, respectively in *Vanaraja* female line. The hatchability on TES was low and needs improvement in hatching conditions.

Germplasm supply

A total of 60,008 *Vanaraja* chicken germplasm was distributed to the farmers in Bihar during the year 2017-18 (Table 8). About 82% chick distribution was through day old chicks, which is an encouraging sign for rural poultry in Bihar. Farmers preferred grown up chicks rather than day old chicks in Bihar. Most of the agency/farmers usually prefer to take grown up chicks after completion of brooding stage. The backyard poultry activity was propagated effectively through various agencies like ATMA, NGOs and KVKs. Birds were also distributed among the farmers through Agricultural Technology Management Agency in the naxal affected areas of Jehanabad and Gaya as one of the naxal rehabilitation activity. Demonstration and training programmes were organized by the PSP, BVC, and Patna with the help of ATMA for adoption of backyard poultry among the farming community. An amount of Rs. 10.43 lakhs revenue was generated.

Table 8. Germplasm and revenue generation at Patna

Month	Germplasm	Revenue (Rs.)
April 2017	2045	102099
May	9299	132645
June	2818	105000
July	3143	113869
August	5148	86341
September	10983	60630
October	3987	169162
November	1228	24990
December	6928	89503
January 2018	6536	117643
February	2798	41024
March	5095	-
Total	**60008**	**1042906**

Feedback from the beneficiaries

Backyard poultry has been one of the rehabilitation programs in Naxal affected districts in Bihar. The farmers reared the *Vanaraja* birds under backyards under free range conditions. The farmers expressed satisfaction on the performance of the birds under backyard system of rearing.

Constraints and difficulties, if any

- High mortality during growing period especially in winter season
- Less demand for chicks during winter season
- High feed cost

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

Four batches (2 *Vanaraja* and 2 *Srinidhi*) of parents were reared at Jharnapani during the reporting period. A total of 2250 parents of *Vanaraja* and *Srinidhi* were in position at present. The body weights of *Vanaraja* and *Srinidhi* parents at different weeks are presented in Table 9. The body weight in male of *Srinidhi* was higher, which needs to be maintained by following proper feed restriction schedule to maintain the target body weight for optimum reproductive performance. The body weight in female lines needs to be improved for optimum production.

Egg production

The HDEP in *Vanraja* and *Srinidhi* parents at different weeks are presented in Table 10. The production of 50% was attained at 36 weeks of age in both *Vanaraja* and *Srinidhi* parents. The egg production was consistent in both *Vanaraja* and *Srinidhi* parents. In *Vanaraja* female line, the egg production maintained at later stages also with 42% production at 72 weeks of age. However, in *Srinidhi* the initial production was better which reached up to 40% as early as 28 weeks of age.

Table 10. Egg production (HDEP) in parents of *Vanaraja* and *Srinidhi*

Age (wks)	*Vanaraja*	*Srinidhi*
28	9.01	48.11
36	53.02	62.61
40	52.09	61.49
52	50.16	33.35
64	48.41	59.52
72	44.29	28.72

Hatching performances

The overall fertility rate was 89.3 which varied from 88 to 90% in *Vanaraja* and 88.08 which ranged from 87 to 88% in *Srinidhi* (Table 11). The hatchability on FES varied between 81% in *Vanaraja* and 77%, respectively in *Srinidhi* parents across different batches.

Table 11. Hatching performance of *Vanaraja* and *Srinidhi* parents

Batch	*Vanaraja*			*Srinidhi*		
	Fertility (%)	Hatchability (%)		Fertility (%)	Hatchability (%)	
		TES	FES		TES	FES
I	89.98	73.11	81.25	89.57	71.46	79.77
II	90.20	73.40	81.37	86.59	64.40	74.37
III	89.27	69.05	77.35	-	-	-
IV	87.75	72.64	82.78	-	-	-
Overall	**89.30**	**72.05**	**80.69**	**88.08**	**67.93**	**77.07**

Table 9. Body weights (g) in *Vanaraja* and *Srinidhi* parents lines

Age (wks)	Vanaraja		Srinidhi	
	Male line	Female line	Male line	Female line
4	382.6	280.5	672.5	207.9
6	576.3	432.2	875.6	306.5
12	1087	932.6	1581	742.9
16	1875	1375	2440	1056
20	2294	1715	2999	1185

Germplasm supply

A total of 1,36,828 improved chicken germplasm was distributed to farmers of Nagaland and neighbouring states during the year 2017-18 (Table 12). The germplasm supply was highest since the inception of the project and covered around 1,821 farmers in Nagaland and other NEH states. A total of Rs. 57.42 lakhs revenue was generated under PSP at Jharnapani Centre. A total of 75411 chicks of *Vanaraja* and *Srinidhi* varieties were provided to 1564 beneficiaries under Tribal Sub Plan (TSP). The centre achieved the set targets and effectively popularized the rural poultry farming in tribal and rural areas of Nagaland and neighbouring states. The centre effectively demonstrated backyard poultry farming as potential tool for improving the nutritional and livelihood security of tribal people in Nagaland.

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

- Limited housing facility.
- Only one setter is available at present. One more setter is urgently required

Table 12. Germplasm supply and revenue generation

Month	Germplasm	No. of beneficiaries	Revenue (Rs.)
April 2017	13736	129	520339
May	13768	262	522105
June	15950	83	763808
July	14040	170	667119
August	10775	161	616690
September	8732	51	319580
October	7457	58	361101
November	4754	124	192710
December	7918	137	320988
January2018	14412	277	559159
February	14447	250	532848
March	10839*	119	365183
Total	**136828**	**1821**	**5741630**

*****Includes 1252 grown up birds

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 2017-18. The body weight of male and female parents of *Vanaraja* at 20 weeks of age was marginally higher than the standard body weight (Table 13). The feed restriction needs to be monitored to maintain the standard body weight for optimum production during laying period.

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

Age (wks)	Body weight (g)	
	Female line	Male line
4	369	588
6	680	835
12	1162	1260
16	1632	17020
20	2208	2565

Egg production

The average HDEP in *Vanaraja* was 50 (24-72 weeks) during the reporting period (Table 14). Peak production (70%) was attained at 31-34 weeks of age. The egg production was consistent throughout the laying period in both the batches. 50 percent production attained at 28 weeks of age and maintained till 60 weeks of age with better persistency of production in *Vanaraja* at Gangtok indicating the better management at the Centre.

Hatching performance

The average fertility and hatchability (TES) in *Vanaraja* female line were 85.58 and 80.42% respectively. The fertility and hatchability is fairly good indicating ideal hatching conditions.

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

Age (wks)	I batch	II batch
28	61.14	48.34
36	54.89	63.75
40	50.98	66.51
52	51.67	52.33
64	43.18	
72	25.73	
Average	50.00 (24-72 wks)	57.00 (24-53 wks)

Germplasm supply

A total of 94,800 improved chicken germplasm of *Vanaraja* was distributed to 3,360 farmers (Table 15) covering 917 village habitats in Sikkim. An amount of Rs. 38.81 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% 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.

Table 15. Details of chick distribution in Sikkim

Month	Germplasm	No of Beneficiaries	No of Villages
April 2017	4315	162	41
May	3549	129	55
June	6887	264	66
July	7198	260	81
August	5227	186	115
September	4914	193	51
October	9069	355	79
November	14185	540	98
December	12683	503	76
January 2018	10800	293	109
February	8733	346	79
March	7240	129	67
Total	**94800**	**3360**	**917**

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.

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* and *Srinidhi*) were reared at Manipur Centre during the year, out which 2 are in laying and one in growing stage. The body weight at 20 weeks of age in male and female parents was 3122 and 2100 g in *Vanaraja* and 3566 and 1564 g in *Srinidhi*, respectively (Table 16). The body weight was higher in both male parents, which is not desirable as it affects the reproductive performance of males. It clearly shows that the feed restriction schedule was not followed properly in males. It is suggested to follow the feed restriction in male parents also as per the breeder manual to maintain the body weight.

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

Age (wks)	Vanaraja		Srinidhi	
	Male line	Female line	Male line	Female line
4	495.3±6.09	279.6±6.71	587.4±17.32	229.7±3.88
8	1400.3±34.25	956.3±29.39	1476±27.65	614.3±10.66
12	1650±26.84	1071±35.72	1842±44.15	842.6±25.39
16	2595±50.70	1590±46.48	2448±72.75	1368±21.80
20	3121±48.12	2100±40.17	3566±72.26	1563±29.43

Egg production

The average HDEP was 39% (28-72 weeks) in *Vanaraja* and 46% (24-72 weeks) in *Srinidhi* during the reporting period (Table 17). Peak production (58%) was attained at 45 weeks of age. The egg production was ranged between 40 and 58% from 28 to 58 weeks of age, thereafter gradually reduced as age advance in *Vanaraja*. The production was more consistent in *Srinidhi* from 24-50 weeks of age with more than 50% production with a peak production of 69 % during 48 weeks of age.

Table 17. Hen day egg production (%) in *Vanaraja* parents birds

Age (wks)	*Vanaraja*	*Srinidhi*
28	42.94	52.55
36	51.63	68.04
40	44.03	62.42
52	48.33	52.38
64	29.05	23.92
72	9.52	**20.27**
Average	**38.69 (28-72 wks))**	**46.09 (24-72 wks)**

Hatching performance

The average fertility was 84.02 and 84.96% in *Vanaraja* and *Srinidhi* parents, respectively. The hatchability was 65.47 (TES) and 77.83 % (FES) in *Vanaraja* and 68.39 and 80.45 % in *Srinidhi* parents, respectively.

Germplasm supply

A total 75,126 improved chicken germplasm was distributed to the farmers in Manipur. The centre has generated Rs. 20.26 lakhs of revenue during the year 2017-18 (Table 18).

Field performance and Feedback from the farmers

Field data on growth performance of *Vanaraja* and *Srinidhi* were collected from different places in Manipur (Table 19). The farmers were provided with required feed, medicine and low cost traditional housing systems under tribal sub plan. The body weight at 20 weeks of age in male and female birds was 3350 and 2028 g in *Vanaraja* and 3485 and 1337 g in *Srinidhi*, respectively. The centre has conducted three training/awareness programs in poultry farming to the farmers.

Table 18. Germplasm supply in Manipur

Sl. No.	Beneficiaries (Farmers/ Household/Villages)	District/State	Total No. of Chicks distributed
1	Vengnuam Village (Adopted Village)	Churachandpur	8900
2	Thomkholui Village (Adopted Village)	Churachandpur	7500
3	Farmers (145)	Chandel	4350
4	Farmers (140)	Senapati	3500
5	Farmers (245)	Ukhrul	6125
6	Farmers (150)	Tamenglong	4561
7	Farmers (175)	Imphal West	4375
8	Farmers (110)	Kangpokpi	4214
9	Farmers (120)	Kamjong	3250
10	Farmers (411)	Churachandpur	10526
11	Household (25)	Tamenglong	2750
12	Household (20)	Imphal west	3415
13	Household (20)	Ukhrul	2410
14	Household (49)	Senapati	4900
15	Household (31)	Churachandpur	4350
Total			**75126**

Table 19. Body weight (g) of *Vanaraja* and *Gramapriya* chicks under field conditions

Age (wks)	*Vanaraja*		*Srinidhi*	
	Male	Female	Male	Female
4	421.0	315.5	482.6	293.4
8	1300	986.9	1286	581.0
12	1480	1246	1703	841.5
16	2173	1745	2273	1277
20	3350	2028	3484	1337

Successful beneficiaries

Poultry farming in Manipur has become a great source of income generation activity for women and unemployed youth. Mrs. Luanzaning (62 years), a women from Bethel Dorcas, Veng New Lamka, Churachandpur District, Manipur started rural poultry farming with 100 *Vanaraja* chicks. Low cost housing, day old chicks, feed, medicine, etc. were provided under TSP for her from ICAR NEHR, Manipur Centre. She could successfully earn family income from the birds. On an average the birds laid 35 to 40 eggs per day and were sold at Rs.10 per eggs in the market. She is earning an amount of Rs. 10500 every month. And now she can support her family with additional income from the poultry farming.

Miss Lalbiaksangi (39 years) from Bible hill Rengkai, Churachandpur District, Manipur started poultry farming with the help of ICAR NEH Region Manipur Centre, Imphal under Poultry Seed Project. Low cost housing was constructed for her with locally available materials available and 200 *Vanaraja* chicks including feed and medicine were provided under TSP. At 24 weeks of age the birds are laying around 50-60 eggs per day and were sold at Rs.10.00 per eggs for table purpose. She could able to reproduce and sell the chicks at Rs. 40 to 45 per chicks in the market. In a month she is earning Rs. 18,000/-(approx) from the selling of eggs and chicks and supporting her family.

Mr. Paumuanlal Guite (25 years) an unemployed graduate from College Road, Vengnuam New Lamka, Churachandpur District, Manipur started poultry farming with the help of ICAR NEH Region Manipur Centre, Imphal. Initially 200 *Srinidhi* chicks along with low cost housing system, feed and medicine were provided for starting up his own poultry farm. At 23 weeks of age the poultry birds were giving around 50 to 60 eggs per day and were sold at Rs.10/- per eggs. In a month he could generate an amount of Rs.17,000 to 18,000/- (approx) per month from selling the eggs. In addition to the income he started giving awareness regarding poultry importance of farming for the source of income generation to the young and unemployed person.

Constraints

- Floods in the Month of July 2017
- Fowl cholera outbreak
- Intermittent power supply effecting the brooding operations in the field

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 of *Vanaraja* and *Gramapriya* parents were reared at Hosur Centre during the reporting period of which one is in laying and another in growing stage. The body weight at 20 weeks of age in male and female parents was 2320.7 ± 56.6 and 2056.4 ± 36.9 g in *Vanaraja* and 3163.0 ± 72.5 and 1449.7 ± 38.2 g in *Gramapriya*, respectively (Table 20). The body weight at 20 weeks of age was almost similar to the target body weight in female lines, however it was higher in male line of *Gramapriya* which needs to be maintained for better reproductive performance. The mortality rates at stages (chick, grower and layer) were within the standard limits.

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

Age (wks)	*Vanaraja*		*Gramapriya*	
	Male	Female	Male	Female
4	649.0 ± 26.3	535.4 ± 10.7	337.2 ± 9.7	125.1 ± 3.4
6	1030 ± 17.4	754.7 ± 17.6	610.6 ± 20.6	223.5 ± 6.2
12	1753 ± 46.2	1456 ± 19.2	1752 ± 90.3	746.9 ± 17.7
16	1865 ± 56.3	1760 ± 26.1	2165 ± 93.5	1028 ± 23.1
20	2320 ± 56.6	2056 ± 36.9	3163 ± 72.5	1449 ± 38.2

Egg production

The hen day egg production in *Vanaraja* was consistent through the laying cycle. The average egg production was 67% (32-78 weeks) in *Vanaraja* and 69% (28-74 weeks) in *Gramapriya*, respectively (Table 21). The persistency of production was excellent in both varieties indicating the ideal management practices resulting in optimum productivity from the birds. The peak production was 80.4% (37 wks) in *Vanaraja* and 88% (28 wks) in *Gramapriya*. The egg production was above 50% throughout the laying cycle except for few weeks in *Gramapriya*. The egg weight at 40 weeks was 52.6 and 54.3 g in *Vanaraja* and *Gramapriya* parents, respectively.

Table 21. Egg production (HDEP %) in *Vanaraja* and *Gramapriya* parents

Age (wks)	*Vanaraja*		*Gramapriya*	
	HDEP (Nos.)	Egg weight (g)	HDEP (Nos.)	Egg weight (g)
28			88.0	48.4
36	76.0	51.3	81.8	54.0
40	75.2	52.6	70.1	54.3
52	69.0	55.8	76.2	56.2
64	62.2	57.1	70.2	58.7
72	58.4	57.6	58.6	58.6
Average	**66.87 (32-78 wks)**		**68.86 (28-74 wks)**	

Hatching performance

The average fertility was 79.06% (26-78 wks) in *Vanaraja* and 77.71% (25-72 wks) in *Gramapriya*, respectively. The hatchability on FES was consistent throughout the life cycle (Table 22) in *Vanaraja* and *Gramapriya*; however TES was low in *Vanaraja* which needs to be improved.

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

Age (wks)	*Vanaraja*			*Gramapriya*		
	Fertility (%)	Hatchability (%)		Fertility (%)	Hatchability (%)	
		TES	FES		TES	FES
28	76.3	67.2	88.1	72.3	57.9	80.0
36	72.6	67.8	93.4	90.6	77.4	85.4
40	80.1	71.9	89.7	87.6	72.4	82.6
52	86.0	77.4	90.0	91.5	75.0	82.0
64	77.5	64.7	83.5	94.6	85.6	90.5
72	80.8	71.6	88.7	86.8	79.2	91.2
Average	**79.06**	**67.82**	**85.71**	**87.59**	**77.71**	**88.63**

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

Month	Germplasm supply (No.)	Revenue generation (Rs.)
April 2017	4,232	1,04,899
May 2017	9,363	54,727
June 2017	13,321	2,75,257
July 2017	14,984	62,984
August 2017	6,495	4,34,879
September 2017	10,901	31,367
October 2017	8,601	34,104
November 2017	8,014	2,29,045
December 2017	9,067	2,41,681
January 2018	14,568	4,26,150
February 2018	13,437	4,31,990
March 2018	13,887	2,43,102
Total	**1,26,870**	**25,70,185**

Germplasm supply

A total of 1,26,870 (1,02,185 DOC and 24,685 fertile eggs) improved rural chicken (*Vanaraja* and *Gramapriya*) germplasm was distributed to 843 farmers in Tamil Nadu (Table 23). The centre has generated total revenue of Rs. 25.70 lakhs during the year. The centre has achieved the target and effectively disseminated the technologies to end users.

Feedback from farmers

The feedback from the farmers is very much encouraging. *Gramapriya* received a huge welcome among farmers of Tamil Nadu as a bird for *desi* egg production. There was good demand for *Gramapriya* germplasm, the eggs of which are being sold at premium price. Both the varieties were accepted by the farmers especially for backyard and semi-intensive system of rearing.

Under field condition, *Vanaraja* males attained body weight of about one kg at 9-10 weeks of age and *Gramapriya* males attained body weight of about one kg at 11-12 weeks of age, under semi-intensive system of rearing. *Vanaraja* females weighed 850-900 g and *Gramapriya* females weighed around 700-750g at about 2 months of age. *Gramapriya* started egg laying by 21 weeks of age and attained fifty percent production at 24 weeks of age under semi-intensive system of rearing.

Constraints

- Funds need to be increased to scale up the backyard poultry activity

Central Coastal Agricultural Research Institute (CCARI), Goa

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 & reporting of the data.

Work done

Civil works and equipment

The construction of poultry houses completed. All poultry equipment were procured.

Parent stock

One batch each of *Gramapriya* and *Srinidhi* parents were reared at Goa during the year. The body weight in male parent is high which needs to be reduced by following proper feed restriction schedule as per the breeder manual.

Egg production

The egg production was not consistent in the flock. It ranged from 7.67 to 38.8 %, which was very low as per the standards. Proper management and quality feed during laying phase will improve the performance of the birds. The fertility ranged from 46.44 to 94.57 % and hatchability from 51.53 to 91.47%, respectively.

Germplasm

A total of 3,749 improved chicken germplasm was distributed to the farmers of Goa during the year 2017-18.

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

Civil works and equipment

The construction of civil works completed. All the equipments were procured

Parent stock

Two batches of *Vanaraja* and one batch of *Gramapriya* parents were reared under deep litter system during the period. The growing period body weights are presented in Table 24. The body weight was higher compared to standard body weight in *Vanaraja* male line. Proper monitoring of the feed restriction program is needed to maintain the body weights to improve the reproductive performance.

Table 24. Body weight (g) in *Vanaraja* and *Gramapriya* parents

Age (wks)	*Vanaraja*		*Gramapriya*	
	Male line	Female line	Male line	Female line
4	292.2±6.99	418.9±10.54	366.7±4.36	301.5±4.17
6	396.5±9.77	497.6±11.03	497.9±16.09	350.6±8.74
20	2819 ±40.03	1813±27.29	2337±30.52	1504±18.42

Egg production

The age at sexual maturity (ASM) was 170 days in *Gramapriya* female line. The highest egg production (38%) was recorded at 35-38 weeks of age in the entire laying cycle. The egg production and hatchability percentages are very low. Proper feeding with balanced ration and improving the management conditions are very important to improve the productivity of the birds. The PI was suggested to concentrate on improving the management conditions in the farm and also to look for the quality of the feed.

Germplasm Supply

A total 10,759 improved chick germplasm were distributed to 170 farmers in Andaman & Nicobar Islands with revenue of Rs. 1.96 lakhs during the year.

ICAR Research Complex for NEH Region, Umiam, Meghalaya

The centre was converted in to a full-fledged centre with a budget out lay 220.0 lakhs under new SFC for the year 2017-20. The Poultry seed Project was launched on 24th January, 2018 at Umiam. Shri. Ram Muivah, Secretary, NEC, Meghalaya graced the occasion as Chief Guest and also laid the foundation stone for a double storied grower cum layer house under the project in the Dr. R.N. Chatterjee, Director, DPR, Dr. Narendra Prakash, Director ICAR, RC NEHR, Umiam.

Activity assigned

- Construction of civil works
- 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 & reporting of the data.

Work done

Parent Stock

Two batches of *Vanaraja* and *Srinidhi* parent stock were procured and reared under deep litter system at institute farm for production and supply of improved varieties of chicks. The growing period body weight are presented in Table 25.

Egg production

The *Vanaraja* female parents started laying at 175 days while *Srinidhi* at 186 days of age. The HDEP at 36 weeks of age was 43% in *Vanaraja* and 28% in *Srinidhi* parents. The fertility and hatchability (TES) ranged from 76-83% and 49-75%, respectively in *Vanaraja* parents, while the values were 71-79% and 50-62% in *Srinidhi* parents, respectively.

Germplasm supply

A total 22,612 improved chicken germplasm was distributed to the farmers in Meghalaya. The centre has generated Rs. 11.11 lakhs of revenue during the year 2017-18.

Feedback from the field

A total of 2000 numbers of *Vanaraja* and *Srinidhi* chicks were distributed to 110 numbers of tribal beneficiaries under TSP component of the project during the period. The farmers are rearing the birds under low input backyard system and are earning their livelihood through selling of birds and eggs. These improved varieties of chickens are gaining popularity among the rural poultry farmers. All the farmers expressed their satisfaction on the performance of the birds.

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

Age (wks)	*Vanaraja*		*Srinidhi*	
	Male line	Female line	Male line	Female line
4	115.0 ± 12.08	113.0 ± 3.39	113.0 ± 4.36	85.00 ± 7.07
8	440.0 ± 16.95	223.5 ± 10.08	353.0 ± 25.47	220.8 ± 15.88
12	804.0 ± 44.34	650.0 ± 24.89	980.0 ± 60.45	663.0 ± 27.93
16	1620 ± 114.06	1500 ± 49.04	1357 ± 116.19	1480 ± 55.37
20	2250 ± 106.72	1853 ± 35.01	2282 ± 117.38	1593 ± 72.45

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 & reporting of the data.

Work done

Civil works

The poultry houses and hatchery was inaugurated by Hon'ble Vice chancellor, SKUAST, Srinagar.

Parent stock

Two batches of *Vanaraja* breeders were reared during the year 2017-18. The body weight at 20 weeks of age was 2181±53.31g in male and 1684±36.11g in female parents of *Vanaraja* (Table 26).

Egg production

The age at first egg ranged between 170 to 181 days in two batches. The average egg production was above 60% (59-62%) from 56 weeks to 72 weeks of age. The second batch reached 39% production at 30 weeks.

Table 26. Adult body weight (g) of *Vanaraja* parent stock

Age (wks)	*Vanaraja*	
	Male line	Female line
4	410.31±7.10	280.1±4.14
6	706.8±17.14	480.1±7.86
12	1311±30.43	1013±18.10
16	2001±44.24	1520±42.14
20	2181±53.31	1684±36.11

Hatching performance

The hatchability on total egg set ranged from 27.09 to 76.04% in *Vanaraja* parents.

Germplasm Supply

A total of 21,401 *Vanaraja* chicks were distributed to farmers in Jammu and Kashmir.

Sri Venkateswara Veterinary University, Tirupati

SVVU, Tirupati, a new centre was added from year 2017-18 to popularize the rural poultry in the backward regions Rayalaseema and coastal Andhra. The poultry seed project was inaugurated by Dr. R. N. Chatterjee, Director, DPR and Dr. Y. Haribabu, Vice chancellor, SVVU on 1st February 2018.

Activity Assigned

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

Work done

Designs and formal approval for the construction of hatchery and poultry houses were finalized. The works will be taken up during the next financial year.

The centre initiated the *Vanaraja* parent rearing in the existing poultry houses with 500 *Vanaraja* birds under deep litter management.

PVNR Telangana Veterinary University, Warangal

A new centre was added from year 2017-18 to popularize the rural poultry in the backward regions northern Telangana. The poultry seed project was inaugurated by Dr.R.N.Chatterjee, Director, DPR on 22nd March 2018 at Warangal.

Activity Assigned

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

Work done

The civil works will be taken up during the next financial year. The centre initiated the *Vanaraja* parent rearing in the existing poultry houses with 500 *Vanaraja* birds under deep litter management.

Success Stories

A U-turn: From Driving to Livestock Farming (WBUAFS, Kolkata)

Shri Pradip Ghosh Roy, a driver by profession, is a resident of Shimulpur village under Gaighata block of North 24 Parganas district of West Bengal. Most of days he had to stay outside for his profession. His income from driving only was not enough to maintain his family of 5 members. To meet up the household consumption and to add some extra money to the total family income, his wife used to rear few goats along with some desi poultry birds. "Oneday I found few chicks in the courtyard. I asked her and she informed that she bought them from one office. Then I got busy for my work. After around three months I was really astonished to see the birds. I weighed - the biggest one was 2.4 kg and the smallest one was of 1.8 kg. Being curious I enquired the details address of that office and visited the place. It was the North 24 Parganas Krishi Vigyan Kendra at Ashokenagar", Shri Ghosh Roy narrated the story. There he knew the name of that variety was '*Vanaraja*' and he visited the '*Vanaraja* Demonstration Unit' and gathered detailed information about it. It was on this thought that the seed of doing something of his own began to germinate in his mind. At the beginning he procured 75 no of 21 days old chicks and reared them in backyard system. They attained 1.8 kg – 2.5 kg body weight in 3 months. Some birds he sold out and the rest were kept for laying. Hens started laying at around 5 months of age. On an average he got 114 eggs per hen per year. Meanwhile Shri Ghosh Roy took training on '*Vanaraja*' birds rearing from the KVK. A new idea came in his mind and he decided to rear this variety in intensive way till they attain around 2 kg body weight and sell them out for meat. He made a low cost poultry house having capacity of 500 birds. Involving himself fully he started this venture with 350 birds. The average body weight of the birds was 2 kg in 70 days. Presently he is maintaining 4 batches with 500 birds per batch yearly. Besides, he expanded his goatery unit having 42 nos of Black Bengal goats of different ages. He is maintaining his goats as well as birds by preparing feed himself scientifically advised by KVK experts. His annual turnover is around 6 lakhs and now he can run his family very well. He is able to give higher education to his two daughters. His story has been broadcasted in Krishi Darshan by Doordarshan Kendra Kolkata and in Annadata by ETV News Bangla.Shri Ghosh Roy is planning to expand his farm upto the capacity of 1000 birds per batch.

Name	Shri Pradip Ghosh Roy
Address	Vill. – Shimulpur, Block – Gaighata, P.O.– Thakurnagar, P.S.- Gaighata, Dist.- North 24 Parganas, West Bengal, PIN: 743287
Qualification	9th standard
Age	57 years (22.08.1961)
Mobile No:	08327422428
Nature of Venture	Rearing of *Vanaraja* birds – 500 birds per batch Rearing of Black Bengal goats – 40 to 50 goats
Nature of services	Production, marketing and training to other farmers
Annual Turnover	6 lakhs
Farm size (ha)	0.25
No. of Employment	All the family members giving the labour

Smart Integration Enabling Smart Living (WBUAFS, Kolkata)

Shri Harinarayan Biswas is a resident of Chak Jhaudanga village under Gaighata block of North 24 Parganas district. The village is situated near the border of India and Bangladesh. Maximum of the villagers are poor having very meager amount of agricultural land. Along with his agricultural land Mr. Biswas has 3 ponds covering 5 bighas area. Being unemployed he started fishery without proper management. In search of the proper guidance one morning he visited the KVK, Ashokenagar. On being asked about why he wanted to quit agriculture he replied "Every year our fields get flooded and as a result we have to face losses. We are fed up of cultivation and searching for an alternative." While discussing with the KVK experts he got the idea of integrated farming with fishes in his pond and poultry birds on the dykes. He chose one of his pond measuring 2 bighas for fish production and at the beginning he kept 50 *Vanaraja* birds on the dyke. He was satisfied with the growth of the birds as well as the fishes. He sold out the birds among the villagers and earned some money. He, then, decided to increase the no of birds. He made a low cost poultry house for 500 birds on that pond. He used his own trees as raw material to reduce the expenditure. After that he procured 150 *Vanaraja* chicks of 21 days old from KVK and started raising them in that house. To minimize production cost he used to prepare feed by mixing different ingredients along with some vegetables like potato, green bananas, cabbages etc. as per the guidance of the KVK experts. The excreta and left over feed of the birds was used as feed for fishes. As the birds like greens so he covered some portion of the dyke of the pond with net and allowed the birds to scavenge for sometimes everyday. Scavenging enriches the quality of the meat. He is marketing the fishes as well as the birds in the nearby markets. Now he is keeping 6 batches in a year with 150-200 birds per batch. His annual turnover from birds and fishes goes upto 2.8 lakh at present. His endeavor has become an example for the fellow villagers. They are visiting his farm and as the agriculture is not profitable in that area they are getting interested to take up this type of venture. He is planning to use other two ponds in the same way.

Name	Shri Harinarayan Biswas
Address	Vill. – Chak Jhaudanga , Block – Gaighata, P.O.- Jhaudanga, P.S. – Gaighata, Dist.- North 24 Parganas, West Bengal, PIN: 743245
Qualification	M.A. (History)
Age	48 years (05.10.1970)
Mobile No:	08167325737
Nature of Venture	Integrated farming with poultry (*Vanaraja* birds – 150 birds per batch) and fish (pond size 0.32 ha)
Nature of services	Production and marketing
Annual Turnover	2.8 lakhs
Farm size (ha)	0.32
No. of Employment	Family members are involved in farm activities

Success story of a farmer under ICAR-Poultry Seed Project (TANUVAS, Hosur)

Mr. S. Jeevananadhanam residing at Rajakulam village of Kanchipuram district of Tamil Nadu is basically an agricultural farmer. The farmer had been rearing minimum number of livestock for his livelihood preposition along with agriculture. Two years before, 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 received first batch of each hundred number of *Vanaraja* and *Gramapriya* day old chicks during March 2016 from College of Poultry Production and Management, Hosur under ICAR-Poultry seed project.

The farmer properly maintained these chicks and earned a good income through sale of *Vanaraja* birds for meat purpose and maintained the *Gramapriya* for producing native chicken eggs. This gave him an excellent motivation for continuing poultry farming as a business. Based on this experience, the farmer has regularly been purchasing chicks of *Vanaraja* and *Gramapriya* once in two months from CPPM, Hosur through FTC, Kanchipuram which paved way for gradual and sustainable poultry farming business.

At present the farmer is having nearly three batches of *Vanaraja* and *Gramapriya* birds integrated with quail, duck and fish. Till date, the farmer has reared more than ten batches of *Vanaraja* and *Gramapriya* chicks and marketed as live and dressed meat. The farmer owns a separate retail outlet for selling dressed meat of the native chicken.

The farmer has been practicing regular deworming and vaccination of birds and also maintaining proper biosecurity in his farm as per the advice from CPPM, Hosur and FTC, Kanchipuram. There was no disease outbreak in his farm till date. The farmer attracts huge number health conscious consumers by sale *Vanaraja* and *Gramapriya* meat. The demand for *Vanaraja* meat and *Gramapriya* eggs are always high, so that the farmer has been marketing these products at his farm premises without any difficulty. The farmer has been earning an income of nearly three lakhs per annum through *Vanaraja* and *Gramapriya*.

The continuous rearing of *Vanaraja* and *Gramapriya* birds transformed the farmer from an agricultural farmer to a remarkable poultry entrepreneur in his location. The success of the farmer has been recognized by TANUVAS and the farmer was awarded with “The Best Native Chicken Farmer” award (2017-18) during the TANUVAS foundation day held at Dindigul, Tamil Nadu. All these happened only because of basic germplasm supply through ICAR-Poultry Seed Project and the farmer thanked ICAR and TANUVAS (The farmer’s contact No: 09787302787).

Nursery raising of *Vanaraja* chicks - a success story (SKUAST, Srinagar)

The success story reports nursery rearing of *Vanaraja* chicks by a farmer to earn his livelihood. A marginal farmer struggling to earn his livelihood by raising 200-300 broilers per batch was guided to raise 200 Vanraja chicks per batch upto 4 weeks of age and subsequently to sell to farmers for backyard rearing. The activity on one hand provided for a handsome livelihood to the farmer, and on the other hand increased the availability of nursery raised chicks for backyard poultry farming.

Backyard poultry plays a key role in the home economy and its increased production has the potential to improve food security and assist in poverty alleviation. Backyard Poultry promotion programmes nationwide comprise distribution of improved germplasm of poultry along with package of practices for scientific rearing of chicks in backyard. Such intervention requires nursery raising of chicks at the government farms for further distribution among farmers. The success story reports nursery raising of Vanraja chicks by a farmer to earn his living.

A farmer, Imtiyaz Ahmed Rather S/O Abdul Rashid Rather R/O village Chakoora, District Pulwama in Kashmir in addition to agriculture raised 200 broilers per batch and sold marketable broilers to highway eateries to supplement his income. The village Chakoora is located on the National Highway 1A. The village is primarily an agrarian village. People raise paddy in low lying areas and have raised apple orchards on carevas. Besides they kept livestock and backyard poultry. The farmer struggled with broiler farming as small scale of operations coupled with increased input cost and high mortality resulted in meagre profits from the activity. Farmer was guided to procure Vanraja chicks from ICAR-Poultry Seed Project raise them upto four weeks of age and sell them to farmers for backyard rearing. Nursery rearing of Vanraja chicks resulted in good earning by the farmer besides making good germplasm available for backyard poultry farming.

Farmer procured two batches of 200 *Vanaraja* chicks each from ICAR-Poultry Seed Project @ Rs 20/chick. Brooding of chicks was carried out in deep litter pens following the standard broiler brooding practices. The commercial broiler starter ration was offered *adlibitum* to chicks during the rearing period and vaccination against Ranikhet and Infectious Bursal Disease was carried out on 5th and 15th day respectively. During four weeks of brooding period there was a mortality of 3.5% in first batch and 2.5% in second batch. The average feed consumption during the brooding period was 0.6 kg/bird. The total investment taking into account the cost of day old chicks, cost of feed and other cost like medicine, vaccination, litter materials and heating cost worked out to be Rs 10,560. The fourth week body weight was 534.2±12.76g and 510.7±17.54g in first and second batch respectively. At the end of four weeks chicks were sold to farmers for backyard poultry farming @ Rs 80/bird. The amount realised after sale of chicks was Rs 15,440 and Rs 15,660 in two batches and the profits per batch was Rs 4880 and Rs 5040 in first and second batch respectively. The earnings per bird in two batches was Rs 24.40 and Rs 25.20.

Table 27. Economics of two batches of *Vanaraja* chicks

Details of Inputs and Earnings	Batch-I	Batch-II
Cost of 200 chicks @ Rs. 20/chick with 2% extra chicks.	Rs 4000	Rs 4000
Cost of feed (0.6 Kg per chick) @ Rs. 38/Kg for 200 chicks	Rs 4560	Rs 4560
Cost of medicine, vaccine, litter materials, heating arrangements @ Rs 10/bird	Rs 2000	Rs 2500
Total input	**Rs 10,560**	**Rs 10,560**
Mortality	7 chicks	5 chicks
Chicks available for sale at 4 weeks of age	193	195
Sale rate	Rs 80/chick	Rs 80/chick
Amount realized from sale	**Rs 15,440**	**Rs 15,660**
Earnings/Income/profit	Rs 4880	Rs 5040
Earning/bird	Rs 24.40	Rs 25.20

The success story demonstrated that nursery rearing of *Vanaraja* chicks could result into handsome earnings to the farmer. At the same time superior germplasm could be made available to the backyard poultry farmers.

Exceptionally high hatchability of *Vanaraja* hatching eggs under field conditions - a success story (SKUAST, Srinagar)

150 *Vanaraja* hatching eggs were provided to 15 tribal farm women for natural incubation using broody hen. The freshly collected hatching eggs were sorted and clean eggs of uniform size, ideal shape, texture were separated out. The eggs were pre-candled to remove the eggs with shell deformities, hairline cracks etc. Training with regards to selection of broody hen, preparation of the egg nests, feeding, care and management of brooding hen during the period of incubation was provided prior to setting of eggs for incubation. The overall hatchability on total eggs set (HTES) was 98% and hatchability on fertile eggs set (HFES) was 98.66%. The farmers were quite satisfied with the results of incubation and having hatched the chicks through natural incubation at their premises, farmers showed more involvement and care in rearing the chicks. The success story further demonstrates that excellent hatchability under natural incubation could be achieved through careful selection of hatching eggs, less pre-incubation holding period of the eggs, optimum brooding nest material. Moreover, distribution of hatching eggs could be a low cost intervention to promote backyard poultry farming.

Backyard Poultry promotion programmes nationwide comprise distribution of improved germplasm of poultry in form of day old chicks or nursery brooded chicks along with package of practices for scientific rearing of chicks in backyard. Such intervention involves cost which at times acts a limiting factor. To decrease the cost of intervention and foster more farmer involvement, this success story reports distribution of hatching eggs of improved verities among women farmers and their successful incubation using broody hens. Broody hen hatches the chicks with very low costs. This is a great advantage for the rural people who have no access to electric incubators, which is more expensive and operate with large amount of eggs. Broody hens later act as the best trainees for their offspring in showing them how to look for feed and to tackle adverse situations like protection from predators.

The study was carried out at Gujjar Patti, Village Yarmuqam, District Gandebal, a tribal village 10 km from district headquarter and 25 kilometres from capital city of Jammu & Kashmir. It was performed under the activities of ICAR- Poultry Seed Project and Frontline demonstration programme of Krishi Vigyan Kendra Ganderbal. A survey was first conducted to investigate the availability of a sufficient number of broody hens as well as the interest of the farmers. Women beneficiaries were asked to choose medium sized hens that were set on dummy eggs to induce broodiness. Care was taken that all the hens were in good health and had all normal feathers. Naked neck hens were avoided. To free the birds from the ecto and endo-parasites, the hens were dusted and dosed 3-4 days prior to setting the hens on eggs. A traditional eggs nest comprising a willow/ wicker basket of 10 inch diameter at base, 15 inch at top and 15 inch depth. Basket was filled to a 2/3rd portion with soft straw pressed down to make a hollow for placing the eggs. The hen was then gently seated on the eggs and left undisturbed in a quiet corner of less frequented room of the farmer's house. Some farmers placed a piece of iron in the straw. The hens were usually allowed to come off their eggs at least once every day and to stay as they wanted usually for 15 - 30 minutes. Clean water and grains (mixture of broken rice and maize) placed about 3-4 ft from the nest.

Hatching eggs produced from *Vanaraja* Parent Stock were used in the study. Clean, sound eggs with strong shell texture and average egg weight of 51.3±2.77 g, shape index of 71-74% were collected over a period of 5 days. Further the eggs were pre-candled to separate out the eggs with shell defects, hairline cracks and other abnormalities. One hundred and fifty such eggs were carried to the study area in proper packing to prevent adverse effects of long distance transportation. The 10 eggs each were distributed among 15 women beneficiaries in the study area for setting under the broody hen. All the 15 beneficiaries were able to set the eggs within 3 days duration. Weekly visits were paid to the study area to supervise incubation process.

At the end of incubation process a field day was organized in which all the 15 beneficiary female farmers participated. The farmers had come with their broody hens and their brood of chicks. Broody hens weighed 950-1100g. The age of the broody hens ranged from 2 to 4 years as reported by the farmers. 13 out of 15 farmers had obtained 100% hatchability by hatching all 10 chicks out of 10 hatching eggs set for incubation. One farmer had a hatching of 90%

(9 chicks out of 10 hatching eggs) and other farmer had hatchability of 80% (8 chicks out of 10 hatching eggs). The break-out study on three un-hatched eggs revealed one infertile egg and two late embryonic mortalities. The overall hatchability on TES was 98% and hatchability on FES was 98.66%. Highly excellent hatchability results in our study could be attributed to careful selection of hatching eggs, less pre-incubation holding period of the eggs, relatively lesser number of eggs set under the broody hen, optimum brooding nest material and above all involvement of the women farmers.

The results of this study indicated that proper selection of hatching eggs, broody hens and brooding nests resulted in excellent incubation results. The farmers were quite satisfied with the results of incubation and desired to have more hatching eggs for incubation. The average weight of chicks at hatch was 36.27±2.11 g. The farmers were advised about requirements of young chicks, their nutrition and housing. Further the procedure of medication and vaccination was demonstrated. Having hatched the chicks through natural incubation at their premises, farmers were showing more involvement and care in rearing the chicks. The success story further demonstrated that distribution of hatching eggs could be a low cost intervention to promote backyard poultry farming.

Critical Observations

WBUAFS, Kolkata

Accomplishments and achievements

a. Six cycles of *Vanaraja* parents were reared
b. Distributed 79,890 chicks of *Vanaraja* to farmers
c. Generated an amount of Rs 11.02 lakhs revenue
d. Demonstrated two success stories of *Vanaraja* farming

Short fall

a. Target of germplasm was not achieved

Suggestion for further improvement

a. Efforts should be made to meet the target supply

BASU, Patna

Accomplishments and achievements

a. Three batches of parents were reared
b. Supplied 60,008 chicks of *Vanaraja* to farmers
c. Generated Rs. 10.43 lakhs of revenue
d. Achieved the target of germplasm supply

Short fall

a. Hatchability on total egg set needs to be improved
b. Data from field was not collected

Suggestion for further improvement

a. Efforts should be made to improve the hatchability by optimizing the hatching conditions
b. Data from the farmers' fields need to be collected

RC of ICAR Research Complex, Jharnapani

Accomplishments and achievements

a. Four cycles of parent rearing was in progress.
b. A total of 1,36,828 improved chicken germplasm was distributed to the farmers
c. An amount of Rs. 57.42 lakhs revenue was generated
d. Centre has achieved the germplasm supply target. The efforts of PI and his team are commendable.

Shortfall

a. Egg production was not consistent, needs improvement

Suggestion for further improvement

a. Feed quality and feed restriction should be ensured to improve the production consistency

ICAR-NOFRI, Gangtok

Accomplishments and achievements

a. Two batches of *Vanaraja* parents were in position
b. Distributed 94,800 chicks to the farmers in the rural and tribal areas of Sikkim.
c. An amount of Rs. 38.81 lakhs of revenue was generated
d. The target supply was achieved. The efforts of the PI and his team are commendable.

Short fall

Nil

Suggestion for further improvement

a. Provide dry environment especially during winter and rainy season

RC of ICAR Research Complex, Imphal

Accomplishments and achievements

a. Three batches of *Vanaraja* and *Srinidhi* parents were reared
b. The centre has supplied 75,126 chicks to farmers
c. An amount of Rs. 20.26 lakhs of revenue was generated
d. Field data collected
e. The target supply was achieved.

Short falls

a. Mortality rate needs to be reduced
b. Body weight at laying was high in parents

Suggestion for further improvement

a. Proper monitoring feed restriction to control the body weight is needed
b. Strict biosecurity measures needs to be adopted at the centre to prevent the diseases
c. Efforts should be made to reduce the mortality

TANUVAS, Hosur

Accomplishments and achievements

a. Two batches of parents were in position
b. Distributed 126870 chicks of *Vanaraja* and *Gramapriya* to the farmers in Tamil Nadu.
c. Generated an amount of Rs. 25.70 lakhs revenue
d. The centre has achieved the target supply.

Short fall

a. Nil

Suggestion for further improvement

a. Nil

ICAR-CCARI, Goa

Accomplishments and achievements

a. Construction poultry house completed
b. One batch each of *Gramapriya* and *Srinidhi* were in position
c. Distributed 3749 chicks to the farmers

Short fall

a. Egg production was low
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. Civil works completed
b. Two batches of parents are in position
c. Distributed 10,759 improved germplasm to the farmers
d. Generated Rs. 1.96 lakhs revenue

Short fall

a. Target supply not achieved
b. Egg production was low
c. Hatchability was 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 in position
b. Distributed 21401 chicks to the farmers.
c. Documented a success story on poultry farming

Short fall

a. Germplasm supply not achieved

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, Barapani

Accomplishments and achievements

a. Initiated the civil works
e. Two batches of parents are in position
f. Distributed 22,612 improved germplasm to the farmers
g. Generated Rs. 11.11 lakhs revenue

Short fall

Nil

Suggestion for further improvement

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

PVNR TVU, Warangal

Accomplishments and achievements

a. Initiated the civil works
b. Initiated parent rearing in existing facility

Short fall

Nil

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. Initiated the civil works
b. Initiated parent rearing in existing facility

Short fall

Nil

Suggestion for further improvement

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

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

24-25 May, 2017 at College of Veterinary and Animal Sciences, CSKHPKVV, Palampur

Inaugural Session

Chief Guest: Dr. R.S. Gandhi, ADG (AP&B), ICAR

Guest of Honour: Dr. R.N. Chatterjee, Director, ICAR, DPR, Hyderabad and Dr. Arjava Sharma Director, ICAR-NBAGR, Karnal

President: Prof. A.K. Sarial, Vice-Chancellor, CSKHPKV, Palampur,

The Inaugural session was chaired by Dr. R.S.Gandhi, ADG (AP&B), presided over by prof. A.K.Sarial, VC, CSKHPKVV, Palampur. Dr R.S. Jamwal, Director of Research, CSKHPKV, Palampur welcomed all the dignitaries and principal investigators of different centers. Dr. R.N. Chatterjee, Director, ICAR-DPR, Hyderabad welcomed the dignitaries and Centre incharges. He expressed his gratitude to university for conducting Annual Review Meeting of AICRP on Poultry Breeding and Poultry Seed Project at Palampur. He briefed about the objectives and achievements of AICRP on Poultry Breeding and Poultry Seed Project. He narrated that AICRP has developed five location specific rural chicken varieties in the recent past which have been well accepted by local farmers. Dr. Arjava Sharma Director, NBAGR. Karnal stated the importance of poultry farming in alleviating the poverty and providing nutritional security to poor and marginal farmers. He also emphasized the need to conserve native chicken germplasm. Dr. R.S. Gandhi, ADG (AP&B) welcomed all dignitaries and delegates on behalf of ICAR and complemented the progress and achievements of AICRP and PSP. He said that two days extensive deliberations on progress and achievements of different AICRP and PSP centers will help in giving new dimensions towards rural poultry in the country. He thanked Prof. A.K. Sarial Vice-Chancellor for hosting the annual review meeting. Prof. A. K. Sarial, Vice-Chancellor, CSKHPKV, Palampur narrated the importance of agriculture and its allied activities like poultry for sustainable livelihood. He congratulated the team of scientists for developing hill region specific rural chicken variety *Himsamridhi*.

A promising dual purpose location specific rural chicken variety, *Himsamridhi* suitable for rural/ backyard poultry farming for hilly region was released in the gracious presence of all dignitaries. Dr. Y.P. Thakur, PI of AICRP, Palampur briefed the gathering about the genesis and performance of a newly developed chicken variety '*Himsamridhi'*. Dr. R.K. Agnihotri, Dean, College of Veterinary and Animal Sciences proposed the vote of thanks.

Technical Session - I

Presentation of PC Report

Dr**.** R.N. Chatterjee, Director, ICAR-DPR presented the PC Report of AICRP and PSP. At the outset, he congratulated PI, Palmapur and his team for successfully developing and releasing '*Himsamridhi'* for the benefit of farmers in hilly region. He informed that AICRP centers have released five location specific rural chicken varieties in last five years. He appreciated the performance of Mannuthy, Bengaluru and Ludhiana (AICRP) and Nagaland, Sikkim, Patna and Hosur (PSP) centers for achieving the targets. He narrated that germplasm supply by Guwahati, Ranchi, Agartala is poor and need immediate attention to increase the same to meet the targets. He stated that Agartala center needs to speed up efforts to release location specific variety at the earliest. He also stated that five centers of AICRP who have already developed varieties need to add research component into their project to continue as AICRP centers otherwise they will be converted into PSP centers. He advised five new PSP centeres to speed up construction work to create infrastructure so that germplasm supply can be initiated/enhanced from next year. Dr. R.N. Chatterjee suggested all PIs to take approval from concern state biodiversity board for using local native chicken breed directly or for crossing purpose. Dr. R.S. Gandhi suggested periodical monitoring of underperforming centre by AICRP and PSP cell, Hyderabad.

AICRP centres

Anand

Dr. F.P. Savaliya, PI of the Centre presented the progress of Anand Centre. Dr. Chatterjee enquired about the continuous decline in production performance of IWN, IWP and RIR. He observed that the center was performing poorly in all aspects.

Dr. Savaliya informed that demand of chicken is high among poor farmers of Gujarat hence, requested to retain center and promised to do needful to improve the performance of flocks. Dr. Chatterjee suggested to replace both the populations (IWN and IWP) from Mannuthy and RIR from Ludhiana in consultation with ICAR-DPR. Dr. R.S.Gandhi advised co-ordinating center of AICRP to monitor the progress of the Centre closely and suggested to implement the recommendations within six months period.

Mannuthy

Dr. Binoj Chaco, PI of the Centre presented the achievements of Mannuthy centre. Dr Chatterjee enquired about the home tract, plumage colour and physical characters of Tellicherri breed. Dr.Binoj replied that it was collected from Northern Kerala, plumage is black in color and medium size. He complemented centre for impressive germplasm supply and suggested to go for cross of local Tellicherri with Leghorn Lines (IWN and IWP) to develop rural variety. Dr. R.S.Gandhi asked about fund utilization and suggested to reduce the mortality.

Bengaluru

D. C.S. Nagaraja, Incharge of the Centre presented the performance of Bengaluru centre. It was observed that the performance of primary trait i.e. body weight at 5 weeks has reached plateau in PB-1 and PB-2 lines after regeneration for 22 generations. Dr. Chatterjee suggested to introduce variability in the population from Ludhiana centers. Dr. R.S.Gandhi suggested to control mortality in the population. Dr. Chatterjee enquired about the status of location specific variety development and purification of native chicken population. He suggested PI to visit ICAR-DPR to see original Ghaghus birds.

Ludhiana

Dr. S.K. Das, Scientist presented the achievements of Ludhiana centre. Dr. Chatterjee appreciated the performance of flocks and comparative increase in germplasm supply. He advised to take steps to reduce mortality and enhance germplasm supply. Dr. Das stated that he is also doing selection for egg production based on osborn index in PB-2 lines. Dr. Chatterjee instructed not to deviate from technical programme. Selection for egg production is to be carried out on the basis of independent culling level in PB-2.

Izatnagar

Dr. V.K Saxena, Incharge of the Centre presented the progress of CARI, Izatnagar. Dr R.S.Gandhi enquired about the reasons of lesser supply of germplasm. Dr. Saxena told that poultry industry was not so common in UP and pattern of germplasm demand is not uniform because of variation in environment. Dr. Chatterjee suggested to reduce mortality in growers. He also enquired about the work on native chicken. Dr. Saxena replied that purification and phenotypic characterization was completed.

Bhubaneswar

Dr. N.C. Behura, Incharge of the Centre presented the progress of Bhubaneswar centre. Dr. Chatterjee enquired whether center has applied for registration of local chicken breed 'Hansli' or not? He also indicated that center needs to improve germplasm supply and initiate pedigree hatching of local breed. Dr. Behura informed that registration is under consideration with NBAGR, Karnal.

Agartala

Dr. Vinay Singh, Incharge of the Centre presented the progress of the Agartala centre. Dr. Chatterjee enquired about the delay in the development of rural chicken variety? Dr. Vinay informed that three way cross has been developed and its evaluation under field conditions is in progress. Dr. Chatterjee suggested not to keep so many crosses. He instructed PI to follow technical programmes and suggestions given by PC from time to time. He also asked him to collect data from field in proper way without missing performance of traits. Dr. Gandhi advised to monitor the centre every 3 months and help in development of the location specific variety.

Jabalpur

Dr. J.K. Bharadwaj, Incharge of the Centre presented the achievements of Jabalpur centre, Dr. Chatterjee , appreciated the germplasm supply of *Narmadanidhi*. Dr. Gandhi and Dr. Chatterjee advised to publish the success stories of *Narmadanidhi* and its impact on the livelihoods of the poor and marginal farmers. Dr. Chatterjee also enquired about the availablity of Kadaknath breed in Jabalpur ceneter. Dr. Bhardwaj informed that enough population is there with the Ceneter.

Udaipur

Dr. S.K Misra, Incharge of the Centre presented the progress of Udaipur centres. Dr Chatterjee enquired, why Udaipur should not be converted into PSP center as it has developed backyard chicken variety? Dr. Misra replied that seeing its demand and popularity among farmers we can think upon improving the performance of *Pratapdhan*. Dr. Chatterjee constituted a committee to finalize technical programme for those centers that have already developed location specific rural varieties with Dr. U. Rajkumar, PS, DPR; Dr V. K. Saxena, PS, CARI and Dr. Chandan Paswan, Scientist, DPR.

Palampur

Dr. Varun Sankyan, Asst. professor presented the progress of Palampur centre. Dr. Chatterjee congratulated Dr. Y.P. Thakur and his team for developing and releasing *Himsamridhi*. Dr. Sankhyan narrated about the performance of cross at farm and field condition. Dr. Gandhi suggested to study the impact of *Himsamridhi* on socioeconomic status of beneficiaries.

Guwahati

Dr. Niranjan Kalita, Incharge of the Centre presented the progress of Guwahati centre. Dr. Chatterjee asked why the germplasm supply of the center is so low? Dr. Kalita replied that the farmers are not ready to take day old chicks therefore we need to raise up to at least 8 weeks of age and supply to the farmers. This process take space and unable to meet the target. Dr. Chatterjee suggested supply chicks maximum at the age of 4 weeks. He also instructed to increase germplasm supply. Dr. Gandhi suggested to check performance of Kamrupa over generations. He also stated that germplasm supply needs to be increased.

Ranchi

Dr. Sushil Prasad, Incharge of the Centre presented the progress of Ranchi centre. Dr. Gandhi suggested to increase germplasm supply through linking with KVKs and Govt. line departments and NGOs. Dr. Prasad stated that they have started reciprocal cross of Jharsim to meet the demand of more egg in the locality. Project coordinator asked not to change technical programme without consulting competent authority. Dr. Chatterjee also advised to give more emphasis on improving germplasm supply to farmers.

Technical Session II

Poultry Seed Project

Manipur

Dr. Blessa Silo, Scientist presented the progress of the Centre. He narrated the innovative incubator being developed by an unemployed local youth with technical guidance from ICAR Manipur Centre. Observing the high mortality, Dr. Chatterjee asked to provide required space to birds as per their age groups to reduce the mortality. Various extension activities undertaken by the Centre are appreciated.

Sikkim

Dr. Rafiqul Islam, Scientist presented the progress of the Centre. He expressed the constraints of space for rearing parents. Dr Chatterjee asked to write for re-appropriation of budget for construction work. Dr. Chatterjee also asked about the *Vanaraja* village established at Sikkim. Dr. Rafiqul replied that it is running very successfully with lot of demand for *Vanaraja*. The efforts of project team were duly appreciated for meeting the target supply.

Nagaland

Dr. Mahek Singh, Scientist presented the progress of Nagaland centre. Dr. Chatterjee appreciated the efforts made by center to cross assigned target of germplasm supply in spite of having several constraints. Dr. Gandhi enquired about the demand of chicks in the locality. Dr Singh replied that demand of *Srinidhi* is more in the area in addition to *Vanaraja*.

Kolkata

Dr.S.Pan, Professor presented the progress of the Centre. He presented the progress of *Vanaraja* backyard farming and its acceptability in Sundarbans. He also narrated about mixed farming being adopted in West Bengal. Dr. Pan also expressed the limitation of floor space. Dr Chatterjee replied that there is provision of fund for minor work that can be utilized for the same. Dr. R.S. Gandhi and Dr. Chatterjee told to utilize the funds generated at the centre for the purpose. Dr. Pan requested to send a communication to Vice Chancellor of the University from the Council/ DPR. Dr. R.N. Chatterjee, Director agreed to send a communication to all the Centres regarding utilization of funds generated at the Centres.

Durg

Dr.Mukherjee, Incharge of the Centre presented the progress of the Centre. Dr. R.S. Gandhi and Dr. Chatterjee enquired why the centre has not achieved the target. Dr. Mukherjee informed that the Centre is slowly working on improving the germplasm supply and there is a lot of demand. He requested for additional housing for birds, feed storage and incubators for the Centre.

Patna

Dr. Pankaj Kumar, Incharge of the Centre presented the progress of the Centre. The centre achieved the target of germplasm supply. Low cost housing for poultry shed was demonstarted. He also narrated about Azola feeding to birds by farmer. Dr Chatterjee asked about the egg quality of chicken if fed only Azola and suggested to do some biochemical analysis of egg. Dr. Gandhi appreciated efforts for low cost housing and asked to publish success stories related to technology intervention and improvement in livelihood security of farmers.

Hosur

Dr. S. Shamsuddin, presented the progress of the centre. Dr. Chatterjee enquired about the infrastructure development at the Centre. Dr. Shamsuddin replied the construction works are in progress. The Center achieved supply of one lakh target. The performance of birds at the Centre is as per the standards. Dr. Gandhi and Dr. Chatterjee appreciated the efforts of the team for good work carried out during the year.

Srinagar

Dr. A.A. Khan, presented the progress of the Centre. Dr. Gandhi suggested to monitor the Centre closely and inform the Vice Chancellor regarding poor performance of the Center. The centre progress will be reviewed from time to time and appropriate decision will be taken for continuance

Portblair

Dr. A. Kundu, presented the progress of the Centre. He narrated the Vanaraja parent rearing and progress of the works and equipments. Dr. Chatterjee and Dr. Gandhi stressed upon completing construction work at the earliest. Dr. Gandhi advised to monitor this center closely on regular basis.

Barapani

Dr. S.K. Dole, presented the progress of the Centre. Dr. Gandhi and Dr. Chatterjee expressed satisfaction on the progress of the centre inspite of no budgetary allocation for the centre. Dr. Dole requested to provide the budget in the new EFC proposal. Dr. Chatterjee assured some budgetary provisions in the new EFC proposal to the centre.

Goa

The Centre In charge could not attend due to personal problems. Dr. Gandhi was not happy and suggested to write to the Director ICAR - CCARI, Goa for explanation.

Dr. U. Rajkumar, PS, DPR presented the technical program. The following technical program was approved in addition to the existing program. All the centres which developed a variety can concentrate on the improvement of the native chickens for improving the cross performance.

Technical Programme

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.

Plenary session

Dr. Chatterjee, congratulated all PIs for progress made in last one year and expressed confidence that those who are not up to mark will take a note of it and improve by next year. If centers are not improving their performance and not meeting the targets in spite of repeated warnings/suggestions, an appropriate decision will be taken for continuing the centre in due course of time. He stated that it is mandatory to take prior permission from concerned state biodiversity board to use native chicken germplasm for commercial purpose either as pure breed or as a cross. All concern PIs may initiate the process registering breed/variety with NBAGR, Karnal. He asked all PIs to submit AUC without which funds would not be released. Dr. Arjava Sharma, briefed about the process of breed/ variety registration and its importance. Dr. R.S. Gandhi congratulated all centers and emphasized that some centres which are not performing to their potential need to work hard to come to the expectations and fulfill the set targets. He emphasized to improve the visibility of the Centre through digitalization, publications, Success stories in local media, ICAR sites etc. He stressed the importance of farm and field validation of technology and its impact analysis. Dr. U Rajkumar, In charge PSP Cell, DPR, proposed formal Vote of Thanks.

Recommendations

General

1. All AICRP centres should take approval from State Biodiversity Board to supply native germplasm / crosses to farmers.
2. All AICRP centres should initiate process of registering native/local chickens with NBAGR, Karnal
3. All AICRP & PSP centers should follow the approved technical programme only.
4. All AICRP & PSP centers will study the impact of technology intervention to improve socio economic status of the farmers
5. All centers in charge should attend the Annual Review meeting without fail.

AICRP

1. The local chicken collected must be stabilized before utilizing in crosses.
2. All AICRP centres should work on the improvement in native chicken with a planned pedigreed mating
3. The economics of all the rural chicken varieties developed at different centres needs to be worked out
4. The work load on the centre in-charges should be reduced by the University.

PSP

1. All the Centres should meet the set target of germplasm supply.
2. The new Centres should expedite the construction works so that germplasm supply can be initiated.
3. The progress of Port Blair and Srinagar Centres should be monitored on regular basis.

Action Taken Report on the Recommendations of AICRP and PSP Annual Review Meeting

24-25 May, 2017 College of Veterinary and Animal Sciences, CSKHPKVV, Palampur

Recommendations	Action Taken
General	
1. All AICRP centres should take approval from State Biodiversity Board to supply native germplasm /crosses to farmers.	Informed to all AICRP and PSP centre incharges
2. All AICRP centres should initiate process of registering native/ local chickens with ICAR-NBAGR, Karnal	Two native chickens viz *Mewari* and *Hansli* have been registered
3. All AICRP & PSP centres should follow the approved technical programme only.	Complied with
4. All AICRP & PSP centres will study the impact of technology intervention to improve socio economic status of the farmers	Informed to all centre incharges. Some centres complied with
5. All centers in charge should attend the Annual Review meeting without fail	Complied with
AICRP	
1. The local chicken collected must be stabilized before utilizing in crosses.	Complied with
2. All AICRP centres should work on the improvement in native chicken with a planned pedigreed mating	Complied with
3. The economics of all the rural chicken varieties developed at different centres needs to be worked out	Informed to all centre incharges to take up economic evaluation of the varieties. Some centres completed the evaluation
4. The work load on the centre in-charges should be reduced by the University.	Informed to the competent authority in the University
PSP	
1. All the centres should meet the set target of germplasm supply	All the old centres achieved the targets of germplasm supply
2. The new centres should expedite the construction works so that germplasm supply can be initiated	Construction works are nearing completion.
3. The progress of Port Blair and Srinagar Centres should be monitored on regular basis	Complied with

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Release of *Himsamridhi* variety at CSKHPKVV, Palampur

A pair of Native chicken at Anand Centre

A flock of Tripura black at Agartala Centre

Distribution of chicks of improved germplasam at Agartala Centre

Birds of CSML x *Hansli* at Bhubaneshwar Centre

Birds of PB-1 x Native at Bengaluru Centre

Birds of *Pratapdhan* variety at farmer's field

Birds of improved backyard variety at Assam

Birds of improved backyard variety at Coimbatore

Vanaraja birds under intigrated farming at Kolkata

Farmer with *Vanaraja* birds under backyard system

Farmers with day old chicks of improved variety at Manipur Centre

QRT team interacting with farmers at Nagaland

A farmer with improved adult birds at Sikkim

A woman farmer with improved variety at Sikkim

Initiation of rearing of *Vanaraja* perents at Tirupati centre


POULTRY SEED PROJECT
(I.C.A.R)
POULTRY SEED PROJECT
Veterinary and Gramapriya
WB UNIV OF ANIMAL & FISHERY SCIENCES

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ICAR - Directorate of Poultry Research

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