

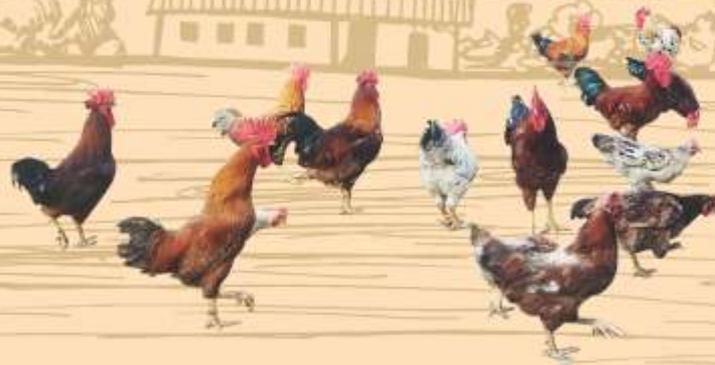
वार्षिक प्रतिवेदन
Annual Report
2019 - 20

AICRP on Poultry Breeding and Poultry Seed Project

ANNUAL REPORT 2019-20



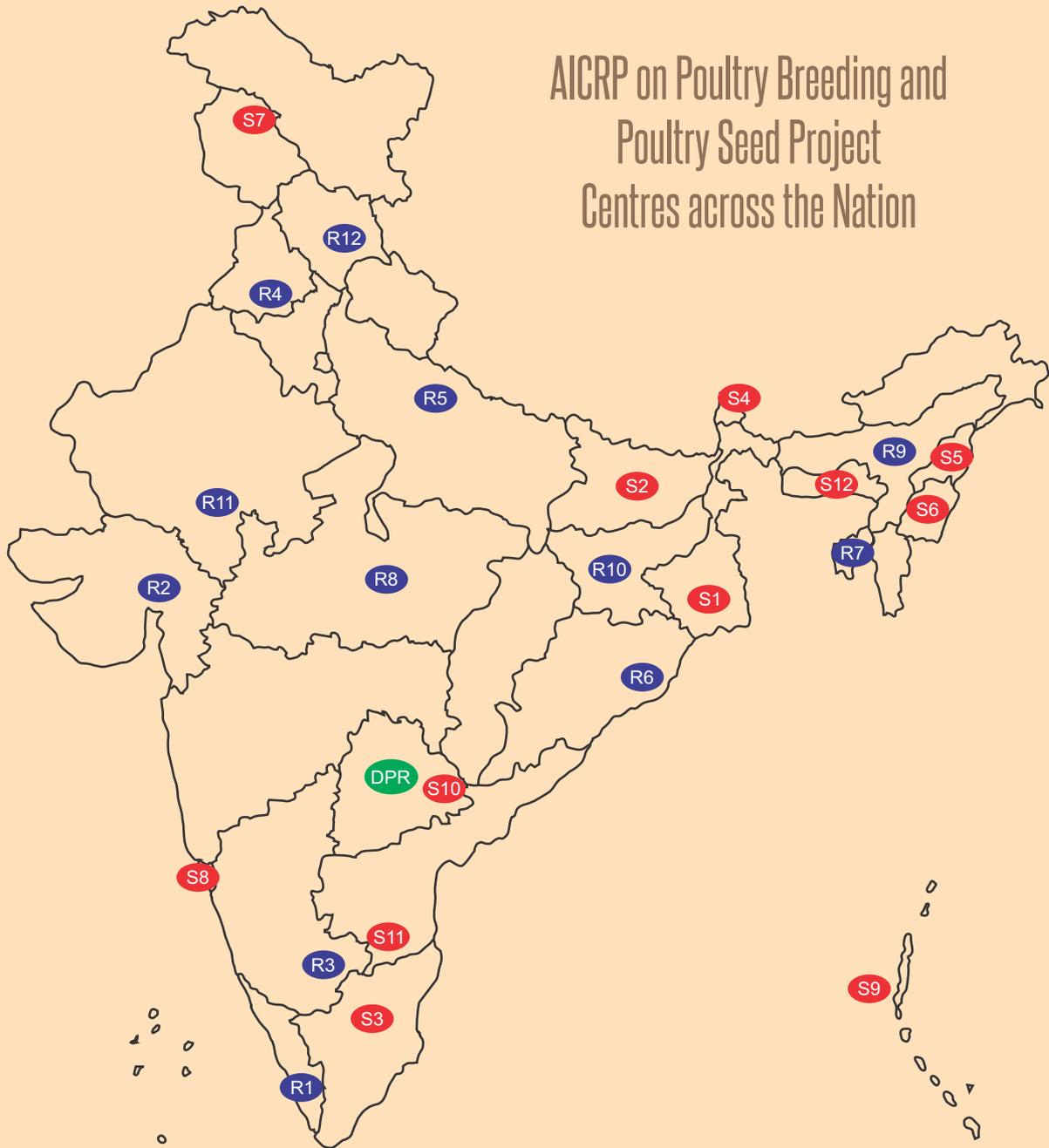
Years of
AICRP



भाकृअनुप - कुक्कुट अनुसंधान निदेशालय
ICAR-Directorate of Poultry Research
Rajendranagar, Hyderabad - 500 030, Telangana, India
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AICRP on Poultry Breeding and Poultry Seed Project Centres across the Nation



ICAR - DPR

AICRP Centres		PSP Centres	
R1	KVASU, Mannuthy	S1	WBUAFS, Kolkata
R2	AAU, Anand	S2	BASU, Patna
R3	KVAFSU, Bengaluru	S3	TANUVAS, Hosur
R4	GADVASU, Ludhiana	S4	ICAR-NOFRI, Sikkim
R5	ICAR-CARI, Izatnagar	S5	ICAR-RC, Nagaland
R6	OUAT, Bhubaneswar	S6	ICAR-RC, Manipur
R7	ICAR-RC, Agartala	S7	SKUAST, Srinagar
R8	NDVSU, Jabalpur	S8	ICAR-CCARI, Goa
R9	AAU, Guwahati	S9	ICAR-CIARI, Port Blair
R10	BAU, Ranchi	S10	PVNRTVU, Warangal
R11	MPUAT, Udaipur	S11	SVVU, Tirupati
R12	CSKHPKV, Palampur	S12	ICAR-RC for NEHR, Barapani
		DPR	

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Front Cover

Rural poultry farming

Inside Front Cover

Location of AICRP on Poultry Breeding
and Poultry Seed Project centres

Inside Back Cover

AICRP & PSP review meeting

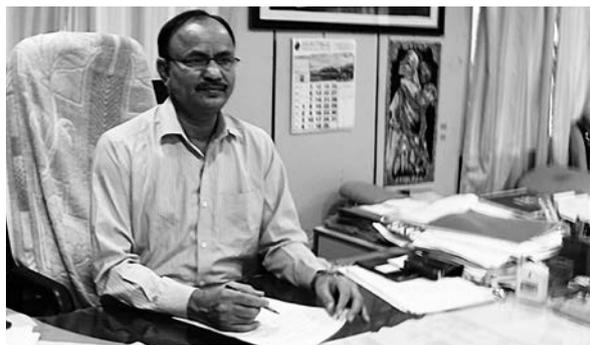
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ICAR-DPR Building

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Preface



The ICAR-Directorate of Poultry Research, a premier organization under the aegis of Indian Council of Agricultural Research mandated to conduct the research in frontier areas of poultry production in the country. The Directorate is coordinating and monitoring twelve centres of All India Coordinated Research Project on Poultry Breeding and twelve centres of Poultry Seed Project. It is my pleasure to present the Annual Report of AICRP on Poultry Breeding and Poultry Seed Project for the year 2019-20.

The AICRP on Poultry Breeding is aimed at developing location specific rural chicken varieties suitable for their local conditions. Besides, the elite layer and broiler pure lines developed earlier are being maintained and improved for economic traits and used in the development of rural crosses. Twelve Poultry Seed Project centres spread across the country are in operation with the aim of increasing the availability of improved germplasm throughout the country. The untiring efforts of all the staff of AICRP on Poultry Breeding and Poultry Seed Project lead to the effective propagation of backyard poultry in the country.

A total of seven success stories and five small scale entrepreneurs have been documented during the year 2019-20 from different centres. During the year a total of 13.97 lakhs of improved chicken germplasm has been distributed to the farmers across the country from different centres of AICRP on Poultry Breeding and Poultry Seed Project. An amount of Rs. 377.1 lakhs revenue was generated by supplying the improved chicken germplasm.

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

Date : 20-09-2020

(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 up to 40 weeks of age
EP64	Egg production number up to 64 weeks of age
EP72	Egg production number up to 72 weeks of age
EW28	Egg weight at 28 weeks of age
EW40	Egg weight at 40 week of age
EW64	Egg weight at 64 weeks of age
EW72	Egg weight at 72 weeks of age
FC	Feed consumption
FCR	Feed conversion ratio
Gen.	Generation
HH	Hen housed
HD	Hen day
S	Survivors'

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कार्यकारी सारांश

कुक्कुट प्रजनन पर अखिल भारतीय समन्वित अनुसंधान परियोजना (एआईसीआरपी)

एआईसीआरपी परियोजनाओं के बारह केंद्रों में सफलतापूर्वक संचालित की जा रही कुक्कुट प्रजनन परियोजना एक है। जिसके अंतर्गत - केवीएएसयू, मन्नुति; एएयू, आनंद; केवीएएफएसयू, बेंगलुरु; जीएडीवीएएसयू, लुधियाना; ओयूएटी, भुवनेश्वर; भाकृअनुप-सीएआरआई; एनईएच क्षेत्र, अगरतला के लिए भाकृअनुप क्षेत्रीय केंद्र; एनडीवीएएसयू, जबलपुर; एएयू, गुवाहाटी; बीएयू, रांची; एमपीयूएटी, उदयपुर; एवं सीएसकेएचवीवी, पालमपुर है। परियोजना का मुख्य उद्देश्य स्थान विशिष्ट कुक्कुट किस्मों का विकास, स्थानीय मूल, कुलीन लेयर एवं ब्रायलर जर्मप्लाज्म का संरक्षण, सुधार, लक्षण वर्णन एवं अनुप्रयोग तथा ग्रामीण, आदिवासी एवं पिछड़े क्षेत्रों में ग्रामीण कुक्कुट पालन एवं उद्यमिता हेतु प्रथाओं के पैकेजों का विकास करना है। इसके अलावा केवीएएसयू, मन्नुति एवं एएयू, आनंद केंद्र दो कुलीन लेयर जर्मप्लाज्म (IWN एवं IWL) को बनाए रखे हैं। केवीएएफएसयू, बेंगलुरु एवं जीएडीवीएएसयू, लुधियाना, ओयूएटी, भुवनेश्वर, भाकृअनुप - सीएआरआई, इज्जतनगर केंद्रों ने चार कुलीन ब्रायलर जर्मप्लाज्म (PB-1, PB-2, CSML एवं CSFL) को बनाए रखे हैं।

उत्तम नस्ल के रैंडमब्रेड कंट्रोल पॉपुलेशन (लेयर के लिए एक एवं ब्रायलर के लिए एक) को भाकृअनुप - कुक्कुट अनुसंधान निदेशालय, हैदराबाद में बनाए रखा गया। इन कुक्कुटों के हैचिंग अंडों के नमूनों को आनुवंशिक प्रगति को मापने हेतु कुक्कुट प्रजनन पर स्थित एआईसीआरपी के विभिन्न केंद्रों को भेजा जा रहा है। परिषद द्वारा लिए गए निर्णयानुसार, विभिन्न एआईसीआरपी केंद्रों एवं भाकृअनुप-डीपीआर में बनाए गए उपभेदों को विभिन्न एआईसीआरपी केंद्रों में द्गुणित किया गया, जिसे केंद्रों द्वारा तीन एवं चार मार्गीय संकरों के उत्पादन हेतु स्रोत संसाधन के रूप में उपयोग किया जा सकता है। विभिन्न एआईसीआरपी केंद्रों में IWD पर IWK को आनंद केंद्र में एवं एवं M-1 एवं M-2I नस्लों को जबलपुर केंद्र में द्गुणित किया जा रहा है। वर्ष के दौरान विभिन्न केंद्रों के किसानों को कुल 8,13,810 कुक्कुट

जर्मप्लाज्म वितरित किया गया। विकसित कुक्कुट जर्मप्लाज्म के प्रसार एवं वितरण के माध्यम से 225.4 लाख रुपये का राजस्व उत्पन्न किया गया।

मन्नुति केंद्र ने इस वर्ष के दौरान IWN, IWP, देशी कुक्कुट एवं उनके संकरों का मूल्यांकन किया। देशी कुक्कुट का 40 सप्ताह में शरीर का वजन 1320 ± 8.92 ग्राम रहा। एस-4 पीढ़ी में 40 सप्ताह की आयु तक देशी कुक्कुट जर्मप्लाज्म का अंडा उत्पादन 78.95 अंडे रहा, जिसका औसत अंडे का वजन 43.04 ग्राम रहा। 16 सप्ताह की आयु में IWN एवं IWP नस्लों में शरीर का वजन क्रमशः 1048 ± 3.21 ग्राम एवं 1082 ± 2.95 ग्राम रहा। जबकि पिछली पीढ़ी की तुलना में 64 सप्ताह की आयु तक IWN (268 अंडे) में अंडे के उत्पादन में 5 अंडों की वृद्धि हुई तथा IWP नस्ल (252 अंडों) में यह 11 अंडे कम हुआ। प्रति पीढ़ी आनुवंशिक प्रतिक्रिया IWN में 9.37 अंडे एवं IWP में -5.94 अंडे रही। इस केंद्र ने वर्ष के दौरान किसानों को कुल 1,07,142 कुक्कुट जर्मप्लाज्म वितरित किया तथा रुपये 19.30 लाख राजस्व उत्पन्न किया।

वर्ष के दौरान आनंद केंद्र ने व्हाइट लेगहार्न वंशावलियों (IWN, IWP, IWD एवं IWF) एवं अंकलेश्वर कुक्कुटों का मूल्यांकन किया। 40 सप्ताह की आयु तक अंकलेश्वर कुक्कुट (S-0) का अंडा उत्पादन 71.06 अंडे रहा। 72 सप्ताह की आयु तक अंडे का उत्पादन IWN में 324.46 एवं IWP में 306.28 अंडे रहा। 40 सप्ताह की आयु तक अंडे का उत्पादन IWD में 116.74 एवं IWK में 114.71 अंडे रहा। इस केंद्र ने वर्ष के दौरान 1395 किसानों को कुल 62,530 कुक्कुट जर्मप्लाज्म वितरित किया तथा रु. 2.73 लाख राजस्व उत्पन्न किया।

बेंगलुरु केंद्र ने वर्ष के दौरान देशी कुक्कुट, पीबी-1 एवं पीबी-2 वंशावलियों एवं उनके संकरों का मूल्यांकन किया। पीबी-1 एवं पीबी-2 वंशावलियों में पांच सप्ताह का शरीर का वजन क्रमशः 1247 ± 3.81 एवं 1093 ± 6.40 ग्राम रहा। 40

सप्ताह की आयु तक पीबी-1 एवं पीबी-2 वंशावलियों में अंडे का उत्पादन क्रमशः 55 एवं 53 अंडे रहा। 8 एवं 12 सप्ताह की आयु में देशी कुक्कुट का शरीर का वजन क्रमशः 468.6 ± 6.50 एवं 864.5 ± 9.23 ग्राम रहा। किसानों को कुल 2,03,328 कुक्कुट जर्मप्लाज्म वितरित किया गया। इस केंद्र ने वर्ष के दौरान रूपए 58.47 लाख राजस्व उत्पन्न किया।

लुधियाना केंद्र ने वर्ष के दौरान पंजाब ब्राउन, पीबी-1 एवं पीबी-2 वंशावलियों का मूल्यांकन किया। पीबी-1 एवं पीबी-2 वंशावलियों में पांच सप्ताह का शरीर का वजन क्रमशः 1295 एवं 1156 ग्राम रहा, जिसका दाना परिवर्तन अनुपात (एफसीआर) क्रमशः 1.95 एवं 1.93 रहा। 40 सप्ताह की आयु तक पीबी-1 एवं पीबी-2 वंशावलियों में अंडे का उत्पादन क्रमशः 65.63 एवं 67.26 अंडे रहा। पंजाब ब्राउन में 8 सप्ताह का शरीर का वजन 767.1 ग्राम एफसीआर के साथ के साथ 3.6 रहा। पंजाब ब्राउन में 40 सप्ताह की आयु तक अंडे का उत्पादन 56.12 अंडे रहा। इस केंद्र ने पंजाब में किसानों को 94,699 जर्मप्लाज्म वितरित किया तथा रूपए 21.37 लाख राजस्व उत्पन्न किया।

भाकृअनुप - सीएआरआई केंद्र ने वर्ष 2019 के दौरान स्थानीय देशी कुक्कुट, CSML एवं CSFL का मूल्यांकन किया। 40 सप्ताह की आयु में CSML एवं CSFL वयस्क कुक्कुटों का शरीर का वजन क्रमशः 3894 ± 11.6 एवं 3643 ± 22.36 ग्राम रहा। CSML एवं CSFL में 40 सप्ताह तक अंडा उत्पादन क्रमशः 68 एवं 69 अंडे रहा। उत्तर प्रदेश में 39 किसानों को कुल 38,833 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। इस केंद्र ने रूपए 29.79 लाख राजस्व उत्पन्न किया।

भुवनेश्वर केंद्र ने वर्ष के दौरान हंसली, सीएसएमएल, सीएसएफएल एवं उनके संकरों का मूल्यांकन किया। हंसली कुक्कुट 176 दिन में परिपक्व हुई एवं 52 सप्ताह की आयु तक 34 अंडे उत्पादित की जिसका वजन 47.22 ग्राम रहा। CSFL एवं CSML में पांच सप्ताह में शरीर का वजन क्रमशः 1032 एवं 1137 ग्राम रहा। CSFL एवं CSML की पिछली आठ पीढ़ियों में फिनोटाइपिक प्रतिक्रिया क्रमशः 38.38 एवं 59.57 ग्राम रही। इस केंद्र ने किसानों को 15,212 कुक्कुट जर्मप्लाज्म वितरित किया तथा रूपए 4.54 लाख राजस्व उत्पन्न किया।

त्रिपुरा केंद्र ने वर्ष के दौरान त्रिपुरा ब्लैक, दलहमरेड, ब्रायलर मादा वंशावली एवं उनके संकरों का मूल्यांकन किया। किसानों के घर आंगन में 20 सप्ताह की आयु में त्रिमागीय संकरों के नर एवं मादाओं का शरीर का वजन क्रमशः 1821 ± 37.13 एवं 1378 ± 18.69 ग्राम रहा। फार्म स्थिति में झुंड में पहला अंडा रखने की आयु 168 दिन रही। क्षेत्र एवं कृषि स्थितियों में वार्षिक अंडा उत्पादन 133 एवं 162 अंडे रहा। घर आंगन कुक्कुट पालन पर 500 किसानों को नौ जागरूकता सह-प्रशिक्षण कार्यक्रम आयोजित किए गए। 311 लाभार्थियों को कुल 40,306 कुक्कुट जर्मप्लाज्म वितरित किया गया। इस केंद्र ने वर्ष के दौरान रूपए 11.57 लाख राजस्व उत्पन्न किया।

जबलपुर केंद्र ने वर्ष के दौरान कड़कनाथ, जबलपुर रंगीन

(जेबीसी) एवं नर्मदनिधि कुक्कुटों का मूल्यांकन किया। जबलपुर रंगीन (JBC) एवं कड़कनाथ में 40 सप्ताह की आयु में वयस्क कुक्कुटों का शरीर का वजन क्रमशः 2130 ± 17.1 एवं 1570 ± 24.2 ग्राम रहा। लैंगिक परिपक्वता की आयु (ASM) क्रमशः 181 एवं 166 दिन रहा। जेबीसी में 52 सप्ताह की आयु तक अंडा उत्पादन 161 अंडे एवं कड़कनाथ में 94 अंडे रहा। नर्मदनिधि ने 52 सप्ताह की आयु तक क्षेत्र की परिस्थितियों में 94 अंडे उत्पादित किए। इस वर्ष के दौरान मध्य प्रदेश में 18.70 लाख राजस्व के साथ 478 किसानों को कुल 58,300 कुक्कुट जर्मप्लाज्म वितरित किया गया।

गुवाहाटी केंद्र ने वर्ष के दौरान देशी, दोथगिरि, दहलेमरेड, पीबी-2 एवं कामरूपा कुक्कुट आबादी का मूल्यांकन किया। दाथगिरि स्वदेशी कुक्कुट नस्ल में 20 एवं 40 सप्ताह की आयु में शरीर का वजन क्रमशः 1021 ± 104.9 एवं 1681 ± 135.6 ग्राम रहा। ASM 210.8 ± 5.20 दिन रहा। 40 सप्ताह की आयु तक अंडे का उत्पादन 34.9 ग्राम अंडे के वजन के साथ 17.9 अंडे रहा। क्षेत्र में कामरूप का 40 सप्ताह का शरीर का वजन 1700 ग्राम एवं फार्म में 2300 ग्राम रहा। कामरूपा किस्म में 52 सप्ताह की आयु तक अंडे का उत्पादन 44 ग्राम अंडे के वजन के साथ 76 अंडे रहा। छह: छोटे पैमाने के उद्यमी विकसित किए गए जो कुक्कुट पालन की गतिविधियां आरंभ किए। इस केंद्र ने किसानों को 44,906 जर्मप्लाज्म की आपूर्ति की। असम में कुल 196 किसान घर आंगन कुक्कुट पालन से लाभान्वित हुए हैं। इस केंद्र ने रूपए 8.15 लाख राजस्व प्राप्त किया जो दाना पर किए व्यय का 53% है।

रांची केंद्र ने देशी कुक्कुट, दलहमरेड, पीबी-2 एवं झारसिम का मूल्यांकन किया। देशी कुक्कुटों में 20 सप्ताह की आयु में नर कुक्कुटों का शरीर का वजन 1476 ± 15.93 एवं मादाओं में 1181 ± 10.63 ग्राम रहा। देशी कुक्कुट में 64 सप्ताह का अंडे का उत्पादन 71 अंडे रहा। 20 सप्ताह की आयु में झारसिम नर एवं मादा कुक्कुटों का शरीर का वजन क्रमशः 1830 ± 4.81 एवं 1670 ± 4.78 ग्राम रहा। क्षेत्र परिस्थितियों में झारसिम का वार्षिक अंडा उत्पादन 148 अंडे रहा। इस केंद्र ने वर्ष 2019-20 के दौरान किसानों को 35,185 कुक्कुट जर्मप्लाज्म वितरित कर रूपए 6.50 लाख राजस्व प्राप्त किया।

पालमपुर केंद्र हिमालयी पर्वतीय क्षेत्रों में हिमसमृद्धि किस्म के प्रसार पर ध्यान दे रहा है। इस वर्ष के दौरान देशी जर्मप्लाज्म, दलहमरेड एवं हिमसमृद्धि का मूल्यांकन किया गया। देशी कुक्कुट में एएसएम, 40 सप्ताह में शरीर का वजन एवं 40 सप्ताह में अंडे का उत्पादन क्रमशः 1490 ± 23.80 ग्राम रहा जो 182 दिन पहले 1490 एवं 50 अंडे रहा। हिमसमृद्धि का वार्षिक अंडा उत्पादन क्षेत्र की परिस्थितियों में 146 अंडे रहा। किसानों के घर आंगन कुक्कुट पालन पर तीन प्रशिक्षण कार्यक्रम आयोजित किए गए। हिमाचल प्रदेश के आदिवासी क्षेत्रों में 411 टीएसपी इकाइयों सहित 694 बैकयाई कुक्कुट किसानों को कुल 68,597 कुक्कुट जर्मप्लाज्म की आपूर्ति की गई। इस केंद्र को वर्ष के दौरान 15.62 लाख रूपए राजस्व प्राप्त हुआ।

2019 के दौरान जर्मप्लाज्म वितरण एवं राजस्व सृजन

केंद्र	जननद्रव्य (संख्या)	राजस्व (रुपए लाखों में)
केवीएएसयू, मन्नूति	107142	19.30
एएयू, आनंद	62530	21.73
केवीएएफएसयू, बैंगलूरु	203328	58.47
जीएडीवीएएसयू, लुधियाणा	94699	21.37
ओयूएटी, भुवनेश्वर	15212	4.54
भाकृअनुप-सीएआरआई, इज्जतनगर	38833	29.79
एनडीवीएसयू, जबलपुर	58300	18.70
एमपीयूएटी, उदयपुर	44772	9.66
एएयू, गुवाहाटी	44906	8.15
सीएसकेएचवीवी, पालंपुर	68597	15.62
बीएयू, रांची	35185	6.50
भाकृअनुप - क्षेत्रीय केंद्र, अग्रताला	40306	11.57
कुल	8,13,810	225.40

उदयपुर केंद्र ने वर्ष के दौरान मेवाड़ी, आरआईआर, सीएसएफएल, प्रतापधन कुक्कुट आबादी का मूल्यांकन किया। मेवाड़ी के मादा एवं नर कुक्कुटों में 40 सप्ताह की आयु में शरीर का वजन क्रमशः 1700 एवं 2300 ग्राम रहा। 52 सप्ताह की आयु तक मेवाड़ी कुक्कुटों में अंडा उत्पादन 69 अंडे रहा। क्षेत्र की परिस्थितियों में प्रतापधन में वार्षिक अंडा उत्पादन 160 अंडे (72 सप्ताह तक) रहा। टीएसपी के तहत 446 आदिवासी किसानों को नौ प्रशिक्षण कार्यक्रम आयोजित किए गए। चालू वर्ष के दौरान 500 किसानों को कुल 44,772 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। केंद्र ने जर्मप्लाज्म वितरण से रूपए 9.66 लाख राजस्व प्राप्त किया।

कुक्कुट बीज परियोजना

देश के सुदूर इलाकों में ग्रामीण कुक्कुट जर्मप्लाज्म की उपलब्धता बढ़ाने के उद्देश्य से कुक्कुट बीज परियोजना विकसित की गयी। इस प्रयास में, भारतीय कृषि अनुसंधान परिषद ने XI पंचवर्षीय योजना के दौरान छह केंद्रों, पूर्वोत्तर क्षेत्र में तीन एवं विभिन्न राज्य पशु चिकित्सा/कृषि विश्वविद्यालयों में तीन के साथ "कुक्कुट बीज परियोजना" का आरंभ किया। परियोजना को दृढ़ करने हेतु अपने संबंधित क्षेत्रों में किसानों की आवश्यकताओं को पूरा करने के लिए XII वीं योजना के दौरान पांच और केंद्रों को इसमें जोड़ा गया। वर्तमान में यह परियोजना देशभर के 12 केंद्रों पर संचालित की जा रही है। इस परियोजना का मुख्य उद्देश्य यह है कि, विकसित कुक्कुट जर्मप्लाज्म (उपजाऊ अंडे, एक दिन की आयु के चूजे एवं बड़े चूजों) का स्थानीय रूप से उत्पादन एवं ग्रामीण कुक्कुट पालन के परिवर्धन हेतु ग्रामीण दूरदराज क्षेत्रों में विभिन्न हितधारकों को अंडे एवं मांस के उत्पादन में वृद्धि को लक्षित करना, लक्षित समूहों की सामाजिक आर्थिक स्थिति एवं संगठित बाजार के साथ छोटे पैमाने पर

कुक्कुट उत्पादकों को जोड़ना है।

कुक्कुट बीज परियोजना (पीएसपी) केंद्र : पश्चिम बंगाल पशु एवं मत्स्य विज्ञान विश्वविद्यालय, कोलकाता; बिहार पशु विज्ञान विश्वविद्यालय, पटना; एनईएच क्षेत्र के लिए नागालैंड क्षेत्रीय केंद्र, झरनापानी भाकृअनुप अनुसंधान परिसर; भाकृअनुप - राष्ट्रीय जैविक खेती अनुसंधान संस्थान, गैंगटोक; एनईएच क्षेत्र के लिए मणिपुर क्षेत्रीय केंद्र, इंफाल भाकृअनुप अनुसंधान परिसर; तमिलनाडु पशु चिकित्सा एवं पशु विज्ञान विश्वविद्यालय, होसुर, भाकृअनुप - केंद्रीय तटीय कृषि अनुसंधान संस्थान, पणजी; भाकृअनुप - केंद्रीय द्वीप कृषि अनुसंधान संस्थान, पोर्ट ब्लेयर; शेर-ए-कश्मीर कृषि विज्ञान एवं प्रौद्योगिकी विश्वविद्यालय, श्रीनगर, पीवीएनआर तेलंगाना पशु चिकित्सा विश्वविद्यालय, वारंगल; श्री वेंकटेश्वर पशु चिकित्सा विश्वविद्यालय, तिरुपति एवं एनईएच क्षेत्र के लिए उमियाम भाकृअनुप अनुसंधान परिसर केंद्र स्थित हैं।

निदेशालय एक समन्वयक इकाई के रूप में प्रत्येक केंद्र को निर्धारित लक्ष्यों को प्राप्त करने के लिए पेरेंट चूजों की आपूर्ति एवं विभिन्न केंद्रों की गतिविधियों की निगरानी कर उन्हें सक्षम करता है। विभिन्न केंद्रों के लिए वर्ष 2019 के दौरान मुख्य भूमि एवं उत्तर-पूर्व केंद्रों के लिए चूजों की आपूर्ति हेतु निर्धारित लक्ष्य प्रति वर्ष 0.3 एवं 1.0 लाख चूजे रहा एवं घर आंगन पालन परिस्थितियों में जर्मप्लाज्म के प्रदर्शन पर प्रतिक्रिया एकत्र करना भी था। वर्ष के दौरान कुल 5,83,527 उन्नत कुक्कुट किस्मों को संबंधित क्षेत्रों / राज्यों में वितरित कर रूपए 153.71 लाख राजस्व प्राप्त किया गया।

कोलकाता केंद्र ने वर्ष के दौरान वानरजा पेरेंटों के तीन बैचों को पाला। 39 सप्ताह की आयु में 79% का उच्च उत्पादन प्राप्त किया गया। पश्चिम बंगाल में 18 किसानों को कुल 11,053 चूजों का वितरण किया गया। इस वर्ष के दौरान रूपए 2.79 लाख राजस्व प्राप्त हुआ।

पटना केंद्र ने वानरजा एवं ग्रामप्रिया के पेरेंटों के दो बैचों को पाला है। 32 सप्ताह में 50% अंडा उत्पादन प्राप्त किया गया एवं 40 सप्ताह में यह 73% रहा। वर्ष 2019-20 के दौरान रूपए 13.39 लाख राजस्व प्राप्ति के साथ बिहार में किसानों को कुल 71,700 वनराजा कुक्कुट जर्मप्लाज्म वितरित किया गया।

वर्तमान में वानराजा एवं श्रीनिधि के दो समूह झरनापानी केंद्र में है। वर्ष 2019-20 के दौरान नागालैंड एवं पड़ोसी राज्यों के किसानों को कुल 79,375 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। झरनापानी केंद्र में पीएसपी के तहत कुल रु 34.63 लाख राजस्व प्राप्त हुआ। इस केंद्र ने जर्मप्लाज्म की आपूर्ति के लक्ष्य को प्राप्त किया।

वनराज पेरेंटों के एक बैच को भाकृअनुप - एनओएफआरआई, गैंगटोक, सिक्किम में पाला गया। सिक्किम में 267 ग्राम आवासियों में 3338 किसानों को कुल 89,826 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु. 21.85 लाख राजस्व प्राप्त किया।

वर्ष के दौरान मणिपुर केंद्र में वनराज, ग्रामप्रिया एवं श्रीनिधि पेरेंटों के तीन बैचों को रखा गया। मणिपुर में

किसानों को कुल 38,709 उन्नत कुक्कुट जर्मप्लाज्म वितरित किए गए। वर्ष 2019-20 के दौरान इस केंद्र ने रु 15.27 लाख राजस्व प्राप्त किया।

रिपोर्टिंग अवधि के दौरान होसुर केंद्र में वनराज के एक बैच एवं ग्रामप्रिया के दो बैचों को रखा गया। तमिलनाडु में 1122 किसानों को कुल **1,36,183** उन्नत ग्रामीण कुक्कुट जर्मप्लाज्म (वनराज एवं ग्रामप्रिया) वितरित किया गया। वर्ष के दौरान केंद्र ने कुल रु.30.42 लाख राजस्व प्राप्त किया।

वर्ष के दौरान श्रीनिधि, वानराज एवं कृषिब्रो पेरेंटों के तीन बैचों को गोवा में पाला गया। गोवा में 1263 किसानों, कर्नाटक में 38 एवं महाराष्ट्र में 4 किसानों को कुल 39,893 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु. 7.54 लाख राजस्व प्राप्त किया गया।

पोर्ट ब्लेयर में गहरे कूड़े (डीप लिट्टर) की व्यवस्था के तहत वानराज एवं श्रीनिधि के पेरेंटों के दो बैचों को पाला गया। वर्ष के दौरान अंडमान एवं निकोबार द्वीप समूह में कुल 180 किसानों को 16,709 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु 1.66 लाख राजस्व प्राप्त किया गया।

एनईएच क्षेत्र, उमियाम, बारापानी के भाकृअनुप क्षेत्रीय केंद्र में वानराज एवं श्रीनिधि के दो बैचों को पाला गया। वर्ष 2019 के दौरान मेघालय में किसानों को कुल 12,606 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु 10.27 लाख राजस्व प्राप्त किया गया।

एसवीवीयू, तिरुपति, आंध्र प्रदेश में वनराज पेरेंटों का एक बैच रखा गया। किसानों को कुल 32,290 चूजों की आपूर्ति की गई एवं इस अवधि के दौरान चूजों एवं अंडों की बिक्री से रु. 4.06 लाख राजस्व के रूप में आय हुई।

रिपोर्टिंग अवधि के दौरान वनराज, ग्रामप्रिया एवं वनश्री के तीन बैचों को पीवीएनआरटीवीयू, वारंगल, तेलंगाना में पुनर्व्यवस्थित किया गया। किसानों को कुल 40,464 उन्नत

ग्रामीण कुक्कुट जर्मप्लाज्म (वनराज एवं ग्रामप्रिया) वितरित किया गया। वर्ष के दौरान केंद्र ने कुल रु 3.85 लाख राजस्व प्राप्त किया।

श्रीनगर केंद्र ने वनराज पेरेंटों को पाला एवं विभिन्न परिस्थितियों के कारणों के बावजूद 18605 वनराज चूजों को वितरित कर रुपए 4.03 लाख राजस्व प्राप्त किया।

कुक्कुट बीज परियोजना के तहत जर्मप्लाज्म का केंद्रवार वितरण

केंद्र	जननद्रव्य (संख्या)	राजस्व (रुपए लाखों में)
डब्ल्यूएफएस, कोलकाता	11053	2.79
बीएसयू, पटना	69435	13.39
भाकृअनुप-क्षेत्रीय केंद्र, झरनापानी	79375	34.63
भाकृअनुप-एनओएफआरआई, गेंगटाक	89826	21.85
भाकृअनुप-क्षेत्रीय केंद्र, इंफाल	37088	15.27
टीएनयूवीएस, होसूर	136183	30.42
भाकृअनुप-सीएआरआई, गोवा	39893	7.54
भाकृअनुप - सीएआरआई, पोर्टब्लेयर	16709	1.66
एसकेयूएसटी, श्रीनगर	18605	4.03
भाकृअनुप - एनईएचआर केंद्र, उमियाम	12606	10.27
पीवीएनआरटीवीयू, वारंगल	40464	5.8
एसवीवीयू, तिरुपति	32290	4.06
कुल	5,83,527	151.73



Executive Summary

All India Coordinated Research Project on Poultry Breeding

AICRP on Poultry Breeding is one of the successful projects being operated at twelve centres viz. KVASU, Mannuthy; AAU, Anand; KVAFSU, Bengaluru; GADVASU, Ludhiana; OUAT, Bhubaneswar; ICAR-CARI, Izatnagar; ICAR RC for NEH Region, Agartala; NDVSU, Jabalpur; AAU, Guwahati; BAU, Ranchi; MPUAT, Udaipur; and CSKHPKV, Palampur. The main objectives of the project are 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 entrepreneurs in rural, tribal and backyard areas. In addition, KVASU, Mannuthy, and AAU, Anand centres to maintain two elite layer germplasm (IWN and IWP). KVAFSU, Bengaluru, and GADVASU, Ludhiana, OUAT, Bhubaneswar, ICAR-CARI, Izatnagar to maintain a total of four (two by each centre) elite broiler germplasm (PB-1, PB-2, CSML and CSFL).

Pedigreed random bred control populations (one for layer and the other for broiler) were maintained at ICAR-Directorate on Poultry Research, Hyderabad. Samples of hatching eggs from these populations are being sent to different centres of AICRP on Poultry Breeding to measure the genetic progress. As per the decision taken by the Council, the strains maintained at different AICRP centres and ICAR-DPR were duplicated at various AICRP centres to be utilized in case of exigencies and as a resource population by the centre for production of three and four way crosses. The strains being duplicated at different AICRP centres are IWD and IWK at Anand and M-1 and M-2 at Jabalpur. During the year a total of 8,13,810 chicken germplasm was distributed to the farmers from different centres. An amount of Rs. 225.4 lakhs revenue was generated through distribution and propagation of the improved chicken germplasm.

Mannuthy centre evaluated IWN, IWP, native chicken and their crosses during the year. The body weight at 40 weeks was 1320 ± 8.92 g in native chicken. Egg production of native chicken germplasm up to 40 weeks of age in S-4 generation was 78.95 eggs with average egg weight of 43.04 g. The body weight at 16 weeks was 1048 ± 3.21 g in IWN and 1082 ± 2.95 in IWP strains, respectively. The egg production up to 64 weeks of age increased by 5 eggs in IWN (268 eggs) whereas it decreased by 11

eggs in IWP strain (252 eggs) compared to the previous generation. The genetic response was 9.37 eggs in IWN and -5.94 eggs in IWP strain per generation. The centre has distributed a total of 1,07,142 chicken germplasm to the farmers during the year. The centre has generated a revenue of Rs. 19.30 lakhs.

Anand centre evaluated White Leghorn lines (IWN, IWP, IWD and IWF) and Ankaleswar chicken during the year. The egg production of Ankleshwar chicken (S-0) up to 40 weeks of age was 71.06 eggs. Egg production up to 72 weeks of age was 324.46 in IWN and 306.28 eggs in IWP strain. Egg production up to 40 weeks of age was 116.74 in IWD and 114.71 in IWK strain. The centre distributed a total of 62,530 chicken germplasm to 1395 farmers during the year. The centre has generated Rs.21.73 lakhs revenue.

Bengaluru centre evaluated native chicken, PB-1 and PB-2 lines and their crosses during the year. The five week body weight was 1247 ± 3.81 and 1093 ± 6.40 g in PB-1 and PB-2 lines, respectively. The egg production at 40 weeks of age in PB-1 and PB-2 lines was 55 and 53 eggs, respectively. The body weight of native chicken at 8 and 12 weeks of age was 468.6 ± 6.50 and 864.5 ± 9.23 g, respectively. A total of 2,03,328 chicken germplasm were distributed to farmers. The centre generated revenue of Rs. 58.47 lakhs during the year.

Ludhiana centre carried out the evaluation of *Punjab Brown*, PB-1 and PB-2 lines during the year. The five week body weight was 1237 and 1156 g in PB-1 and PB-2 lines, respectively with corresponding FCR of 1.95 and 1.93, respectively. The egg production up to 40 weeks of age was 65.63 and 67.26 in PB-1 and PB-2 lines, respectively. In *Punjab Brown*, the 8 week body weight was 767.1 g with FCR of 3.6. The egg production up to 40 weeks of age was 56.12 eggs in *Punjab Brown*. The centre distributed 94,699 germplasm to the farmers in Punjab. The centre generated revenue of Rs.21.37 lakhs.

ICAR-CARI, Izatnagar centre evaluated the local native chicken, CSML and CSFL during the year 2019. The adult body weight at 40 weeks of age was 3894 ± 11.6 and 3643 ± 22.36 g in CSML and CSFL, respectively. The 40 week egg production was 68 and 69 eggs in CSML and CSFL, respectively. A total of 38,833 improved chicken germplasm was distributed to 39 farmers in Uttar Pradesh. The centre realized an amount of 29.79 lakhs revenue.

Bhubaneswar centre evaluated Hansli, CSML, CSFL and their crosses during the year. Hansli birds matured at

176 days and laid 34 eggs up to 52 weeks of age with an egg weight of 47.22 g. The five week body weight was 1032 and 1137 g in CSFL and CSML, respectively. The phenotypic response in CSFL and CSML over last eight generations was 38.38 and 59.57 g, respectively. Centre has distributed 15,212 chicken germplasm to farmers. The centre has generated revenue of Rs. 4.54 lakhs during the year.

Tripura centre evaluated Tripura Black, *Dahlem Red*, broiler dam line and their crosses during the year. The body weight at 20 weeks was 1821 ± 37.13 and 1378 ± 18.69 g in male and females of three way cross under farmer's backyards. The age at first egg in the flock was 168 days in field conditions. The annual egg production was 133 under field conditions and 162 in farm conditions. Eleven awareness cum training programs were organized for 500 farmers on backyard poultry rearing. A total of 40,306 chicken germplasm was distributed to 395 beneficiaries. The centre generated revenue of Rs. 11.57 lakhs during the year.

Jabalpur centre evaluated Kadaknath, Jabalpur colour and Narmadhanidhi populations during the year. The adult body weight at 40 weeks was 2130 ± 17.1 and 1570 ± 24.2 g in Jabalpur colour (JBC) and Kadaknath, respectively. The corresponding ASM was 181 and 166 days, respectively. The egg production up to 52 weeks of age was 161 eggs in JBC and 94 eggs in Kadaknath. *Narmadhanidhi* produced 94 eggs under field conditions up to 52 weeks of age. A total of 58,300 chicken germplasm was distributed to 478 farmers in Madhya Pradesh with revenue receipts of Rs. 18.70 lakhs during the year.

Guwahati centre evaluated native, Doathgiri, *Dahlem Red*, PB-2 and *Kamrupa* populations during the year. The body weight at 20 and 40 weeks of age was 1021 ± 104.9 and 1681 ± 135.6 g, respectively in Doathgiri indigenous chicken breed. ASM was 210.8 ± 5.20 days. The egg production up to 40 weeks of age was 17.9 eggs with

an egg weight of 34.60 g. The 40 week body weight of *Kamrupa* was 1700 g in field and 2300 g in farm conditions. The egg production up to 52 weeks of age was 76 eggs with an egg weight of 44 g in *Kamrupa* variety. Six small scale entrepreneurs were developed who started the poultry farming activity. The centre supplied 44,906 improved germplasm to the farmers. A total of 196 farmers were benefited with backyard poultry farming in Assam. The centre realized receipt of Rs. 8.15 lakhs which was 53% of expenditure on feed cost.

Ranchi centre evaluated native chicken, *Dahlem Red*, PB-2 and Jharsim. The body weight at 20 weeks of age in native chicken was 1476 ± 15.93 in males and 1181 ± 10.63 g in females. The 64 week egg production was 71 eggs in native chicken. The body weight of Jharsim at 20 weeks of age was 1830 ± 4.81 and 1670 ± 4.78 g in male and females, respectively. The annual egg production of Jharsim was 148 eggs under field conditions. The Centre distributed 35,185 chicken germplasm to the farmers with revenue of Rs. 6.50 lakhs during the year 2019-20.

Palampur centre is focussing on propagation of *Himsamridhi* variety in Himalyan hill regions. Native germplasm, *Dahlem Red* and *Himsamridhi* were evaluated during the year. The ASM, body weight at 40 weeks, and 40 week egg production in native chicken were 1490 ± 23.80 g, bring 182 days before 1490 and 50 eggs, respectively. The annual egg production of *Himsamridhi* was 146 eggs under field conditions. Three training programs on backyard poultry farming were conducted to the farmers. A total of 68,597 chicken germplasm were supplied to 694 backyard poultry farmers including 411 TSP units in tribal regions of Himachal Pradesh. The centre realised Rs 15.62 lakhs revenue during the year.

Udaipur centre evaluated Mewari, RIR, CSFL, Pratapdhan populations during the year. The body weight at 40 weeks of age was 1700 and 2300 g in female and male birds of *Mewari*, respectively. The egg production up to 52 weeks of age was 69 eggs in *Mewari* chicken. The annual egg production (up to 72 weeks) was 160 eggs in *Pratapdhan* under field conditions. Nine training programs were organized to 446 tribal farmers under TSP. A total of 44,772 improved chicken germplasm was distributed to 500 farmers during the current year. The centre realized Rs. 9.66 lakhs revenue from the germplasm distribution.

Germplasm distribution and revenue generation during 2019-20

Centre	Germplasm (Nos.)	Revenue (Rs. In Lakhs)
KVASU, Mannuthy	107142	19.30
AAU, Anand	62530	21.73
KVAFSU, Bengaluru	203328	58.47
GADVASU, Ludhiana	94699	21.37
OUAT, Bhubaneswar	15212	4.54
ICAR-CARI, Izatnagar	38833	29.79
NDVSU, Jabalpur	58300	18.70
MPUAT, Udaipur	44772	9.66
AAU, Guwahati	44906	8.15
CSKHPKV, Palampur	68597	15.62
BAU, Ranchi	35185	6.50
ICAR-RC, Agartala	40306	11.57
Total	8,13,810	225.40

Poultry Seed Project

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

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

The Directorate as a coordinating unit, supplies parent chicks, co-ordinates and monitors the activities of different centres to enable them to achieve the set targets for each centre. The target set for supplying chicks for mainland and north-east centres during the year 2019-20 were between 0.3 and 1.0 lakhs chicks per annum for different centres and to collect feedback on the performance of the germplasm under backyard farm conditions. A total of 5,83,527 improved chicken varieties have been distributed in their respective regions/states with a revenue receipts of Rs. 151.73 lakhs during the year.

Kolkata centre reared three batches of *Vanaraja* parents during the year. Peak production of 79% was achieved at 39 weeks of age. A total of 11,053 chicks were distributed to 18 farmers in West Bengal. An amount of Rs. 2.79 lakhs revenue was realized during year.

Patna centre reared two batches of *Vanaraja* and *Gramapriya* parents. The egg production of 50% was achieved at 32 weeks and at 40 weeks it was 73%. A total of 71,700 *Vanaraja* chicken germplasm was distributed to the farmers in Bihar during the year 2019-20 with an amount of Rs. 13.39 lakhs revenue.

Two batches of *Vanaraja* and *Srinidhi* were in position at present in Jharnapani centre. A total of 79,375 improved chicken germplasm was distributed to farmers of Nagaland and neighboring states during the year 2019-20. A total of Rs. 34.63 lakhs revenue was generated under PSP at Jharnapani Centre. The centre achieved the target of germplasm.

One batch of *Vanaraja* parents was reared at ICAR-NOFRI Gangtok, Sikkim. A total of 89,826 improved chicken germplasm of *Vanaraja* was distributed to 3338 farmers covering 267 village habitats in Sikkim with an amount of Rs. 21.85 lakhs revenue.

Three batches of *Vanaraja*, *Gramapriya* and *Srinidhi* parents were reared at Manipur Centre during the year. A total 38,709 improved chicken germplasm was distributed to the farmers in Manipur. The Centre has generated Rs. 15.27 lakhs of revenue during the year 2019-20.

One batch of *Vanaraja* and two batches of *Gramapriya* parents were reared at Hosur Centre during the reporting period. A total of 1,36,183 improved rural chicken (*Vanaraja* and *Gramapriya*) germplasm was distributed to 1122 farmers in Tamil Nadu. The Centre has generated total revenue of Rs. 30.42 lakhs during the year.

Three batches of *Srinidhi*, *Vanaraja* and *Krishibro* parents were reared at Goa during the year. A total of 39,893 improved chicken germplasm was distributed to 1263 farmers in Goa and 38 farmers in Karnataka and 4 in Maharashtra with revenue of Rs. 7.54 lakhs.

Two batches of *Vanaraja* and *Srinidhi* parents were reared under deep litter system at Port Blair. A total 16,709 improved chicken germplasm were distributed to 180 farmers in Andaman & Nicobar Islands with revenue of Rs. 1.66 lakhs during the year.

Two batches of *Vanaraja* and *Srinidhi* parents reared at ICAR RC for NEH Region, Umiam, Barapani. A total 12,606 improved chicken germplasm was distributed to the farmers in Meghalaya with an amount of Rs. 10.27 lakhs of revenue during the year 2019-20.

One batch of *Vanaraja* parents were maintained at SVVU, Tirupati, Andhra Pradesh. A total of 32,290 chicks were supplied to the farmers and generated Rs.4.06 lakhs as revenue by sale of chicks and eggs during the period.

Three batches of *Vanaraja*, *Gramapriya* and *Vanasree* parents were reared at PVNRTVU, Warangal, Telangana during the reporting period. A total of 40,464 improved rural chicken (*Vanaraja* and *Gramapriya*) germplasm was distributed to the farmers. The centre has generated total revenue of Rs. 3.85 lakh during the year.

Sringar centre reared *Vanaraja* parents and distributed 18605 *Vanaraja* chicks in spite of hard ships due to various reasons. The revenue was Rs. 4.03 lakhs.

Centre wise distribution of germplasm under Poultry Seed Project

Centre	Germplasm (Nos.)	Revenue (Rs. in lakhs)
BASU, Patna	69435	13.39
WBUAFS, Kolkata	11053	2.79
ICAR-RC, Jharnapani	79375	34.63
ICAR-NOFRI, Gangtok	89826	21.85
ICAR-RC, Imphal	37088	15.27
TANUVAS, Hosur	136183	30.42
ICAR-CCARI, Goa	39893	7.54
ICAR-CIARI, Port Blair	16709	1.66
SKUAST, Srinagar	18605	4.03
ICAR-RC for NEHR, Umiam	12606	10.27
PVNRTVU, Warangal	40464	5.8
SVVU, Tirupati	32290	4.06
Total	5,83,527	151.73



Budget

AICRP on Poultry Breeding

(Rs. in lakhs)

AICRP Centre	Actual budget released (ICAR share)	Budget (State share)	Total expenditure	Expenditure on feed	Receipts
KVASU, Mannuthy	64.95	21.64	86.59	29.33	19.30
AAU, Anand	59.70	19.90	79.60	41.20	21.73
KVAFSU, Bengaluru	77.35	25.78	103.13	33.26	58.47
GADVASU, Ludhiana	61.20	20.40	81.60	24.67	21.37
Ouat, Bhubaneswar	52.20	17.40	69.60	14.10	4.54
NDVSVU, Jabalpur	77.45	25.82	103.27	-	18.70
MPUAT, Udaipur	67.60	22.53	90.13	12.76	9.66
AAU, Guwahati	61.60	20.53	82.13	15.44	8.15
CSKHPKV, Palampur	67.35	22.47	89.82	23.64	15.62
BAU, Ranchi	53.60	17.86	71.46	8.5	6.50
ICAR RC NEH, Agartala	35.00	-	35.00	17.40	10.26
ICAR-CARI, Izatnagar	-	-	-	-	29.79
Total	678.00	214.33	892.33	220.3	224.47

Poultry Seed Project

(Rs. in lakhs)

Centre	SFC (2017-20)	Budget released (2019-20)	Expenditure	Receipt, if any
WBUAFS, Kolkata	124.13	48.00	48.00	2.79
BASU, Patna	132.96	41.00	41.00	13.39
ICAR-RC, Jharnapani	167.09	59.00	59.00	34.63
ICAR-NOFRI, Gangtok	158.13	51.50	51.50	21.85
ICAR-RC, Imphal	135.67	43.50	43.50	15.27
TANUVAS, Hosur	117.92	60.50	60.50	30.42
ICAR-CCARI, Goa	107.25	22.00	22.00	7.54
ICAR-CIARI, Port Blair	107.25	37.00	37.00	1.66
SKUAST, Srinagar	105.42	28.00	28.00	4.03
ICAR-RC for NEH, Umiam	226.23	86.50	86.50	10.27
PVNRTVU, Warangal	146.26	56.00	56.00	5.82
SVVU, Tirupati	141.19	55.00	55.00	4.06
Total	1669.5	588.00	588.00	151.73



AICRP on Poultry Breeding

History

The Directorate of Poultry Research had a modest beginning during the IV five year plan with two coordinated projects entitled “All India Coordinated Research Project on Poultry for Egg” and “All India Coordinated Research Project on Poultry for Meat” to evolve suitable strains of egg and meat type chicken that combine well for production of commercial layer and broiler crosses. Both these projects were merged into a single project namely “All India Coordinated Research Project on Poultry Breeding” during the V plan. The ‘Rural Poultry’ component of the project was initiated with one centre at Agartala in 2001. Subsequently it was expanded to six centres during XI plan with the sole objective of development of location specific rural poultry varieties. This was elevated to the status of a Project Directorate during the VII plan period. 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. The Directorate had been entrusted with additional responsibilities of maintenance, evaluation, production and supply of control populations of egg and meat to the centres from 1st April, 1990. Maintenance of layer and broiler control populations previously maintained at HAU, Hissar and UAS, Bangalore respectively was assigned to this Directorate w.e.f. 1.4.1990. The Directorate

had been entrusted with the evaluation of commercial layers and broilers developed at different centres of the project vis-à-vis those available in the market from other hatchery sources and maintenance of the elite stocks of layers and broilers available in the country/to be imported from abroad in future and to undertake their genetic description and characterisation with respect to bio-chemical, immunological cytogenetic and disease resistance traits. 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. 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 entrepreneurs in rural, tribal and backyard areas etc.

Location of the centres

A. AICRP on Poultry Breeding

Sl. No	Name of the Centre	Period
1	Anand Agricultural University, Anand	06-07-1977 to 31-03-2021
2	Kerala Veterinary and Animal Science University, Mannuthy	19-02-1977 to 31-03-2021
3	Karnataka Veterinary, Animal and Fishery Sciences University, Bengaluru	14-01-1970 to 31-03-2021
4	ICAR-Central Avian Research Institute, Izatnagar	01-04-1970 to 31-03-2021
5	Guru Angad Dev Veterinary and Animal Science University, Ludhiana	26-02-1977 to 31-03-2021
6	Orissa University of Agriculture and Technology, Bhubaneswar	21-01-1971 to 1990 and 01-09-1991 to 31-03-2021
7	ICAR Research Complex for NEH region, Agartala	01-08-2001 to 31-03-2021
8	Nanaji Deshmukh Veterinary Science University, Jabalpur	11-06-1970 to 31-03-2021
9	Assam Agricultural University, Guwahati	23-03-2009 to 31-03-2021
10	Birsa Agricultural University, Ranchi	23-03-2009 to 31-03-2021
11	Maharana Pratap University of Agriculture & Technology, Udaipur	23-03-2009 to 31-03-2021
12	CSK Himachal Pradesh Krishi Viswavidyalaya, Palampur	23-03-2009 to 31-03-2021
13*	ICAR-Directorate of Poultry Research, Hyderabad	

*Control Population Unit

Monitoring role of the coordinating unit/ Directorate

1. Organization of Review Committee meeting/scientists meet/workshops.
2. Compilation of periodical reports received from individual centres for submission to ICAR and preparation of Annual Report.
3. Verification and scrutiny of proposals received from different centres in all aspects relating to budget, release of funds and in all other matters relating to
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.

the functioning of various centres and their onward transmission to ICAR.



Technical Program



Technical Programme in brief for the year 2019-2020

- 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 crosses.
- Production and evaluation of crosses of local native birds with improved germplasm.
- Development and evaluation of terminal crosses (location specific germplasm)

Native chicken

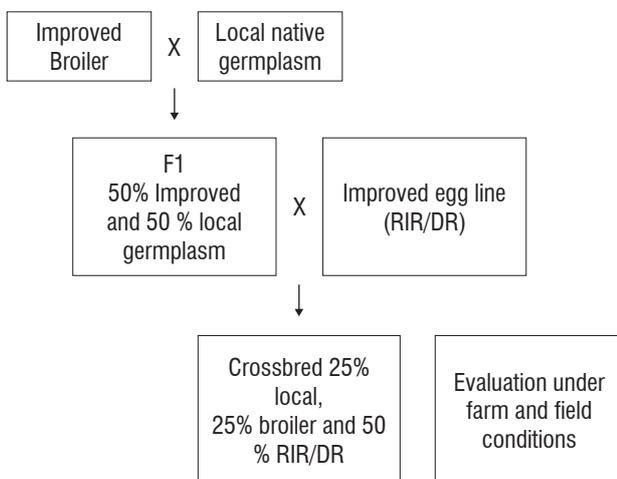
Genetic improvement of native chicken for body weight as well as egg production may be practiced for bringing faster genetic gain in the terminal crosses.

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

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

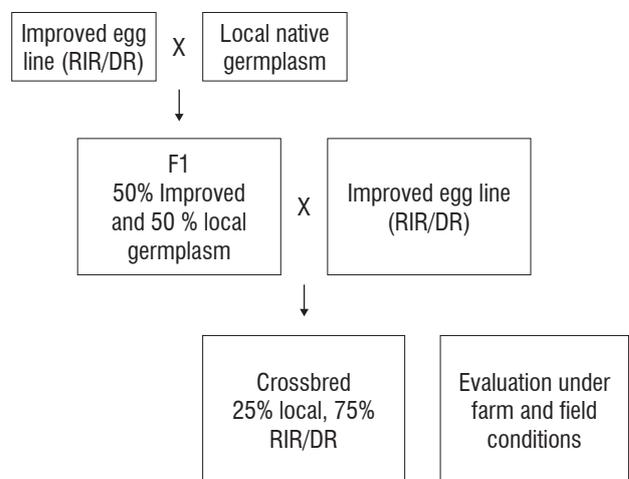
If demand is there for new type of variety (cross) the centre should conduct survey and establish the need for second

Technical program: Dual Type chicken



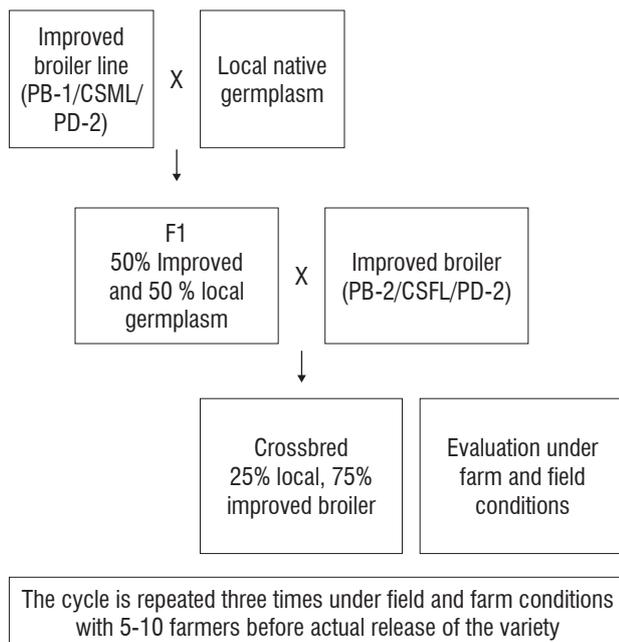
The cycle is repeated three times under field and farm conditions with 15-25 farmers before actual release of the variety

Technical program for Egg type chicken



The cycle is repeated three times under field and farm conditions with 15-25 farmers before actual release of the variety

Technical program for Meat type variety



variety before starting the work. The centres are strictly instructed to start the work only after the approval of the competent authority.

Traits to be recorded

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

Development of crosses

The centre needs to conduct a survey in the region for the consumer preference and acceptability for the type of variety. Based on the survey, a decision is to be taken about the type of chicken variety either dual or egg type, to be developed by the centre

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.

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.
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:

- Age at first egg
- Body weight at 16, 40 and 64 weeks of age.
- 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.
- Egg production to 40 and 64 weeks of age and computation of egg production on hen housed and hen day basis.
- 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.
- 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 on fertile eggs set.
- Mortality during the following periods:
0-8, 9-16, 17-40, 41-64 and 17-64 weeks of age.
- 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.
- 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 retained 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 data. 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 six males per sire 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 500 males at the rate of 10 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.
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. Per cent 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, 9-16, 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 of 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 in each generation.

7. It is expected that at least 3000 chicks will contribute to data at 5 weeks for making necessary selection.
8. Between 5th and 6th week, a total of 1200 females will be selected based on five 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.
9. About 300 to 400 hatching eggs of Control line are to be supplied to each of the broiler centres of the ICAR-Directorate of Poultry Research during their hatching season, for evaluation of environmental trends.

Nutrient	Chicks 0-5 wks	Growers 6-18 wks	Prebreeders 19-23 wks	Breeders 24-54 wks
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	- 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, (Kerala)

Activities assigned

- Conservation, characterization and improvement of the native chicken germplasm collected from the field.
- The egg production up to 64 weeks 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.
- Participation in RSPP tests being conducted by Govt. of India with IWN x IWP cross.
- The centre would supply only a single sex of the pure line parent chicks or the female chicks of IWN X IWP cross for commercial exploitation.
- Development and evaluation of three-way/four-way crosses

Action taken

- The S-5 generation of native chicken was produced and evaluated up to 16 weeks of age.
- IWN and IWP strains were 5 evaluated up to 64 weeks of age during S-31 generation.
- IWN X Native (ND) cross and the cross of ND male with RIR female (NDR) were produced and evaluated in farm condition up to 40 weeks of age.
- The IWN X IWP birds, native chicks and their crosses were supplied to farmers and institutions.

Achievements

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

Production traits of native chickens

Native chicken population was evaluated up to 40 weeks of age in S-4 generation and up to 16 weeks of age in S-5 generation and its performance is presented in Table 1 and 2, respectively. Hen housed egg production up to 40 weeks of age marginally decreased in S-4 generation when compared to S-3 generation (Table 1).

Table 1. Growth and production performance in S-4 generation of native chicken

Traits	N	Mean \pm SE
Body weight (g)		
Day old	200	28.47 \pm 0.21
4 wks	224	168.4 \pm 1.93
8 wks	176	456.5 \pm 6.29
16 wks	620	917.3 \pm 4.95
40 wks	552	1320 \pm 8.92
ASM (d)	599	142.61 \pm 0.51
Egg weight (g)		
28 wks	410	38.26 \pm 0.17
40 wks	389	43.04 \pm 0.48
EP 40 wks (Nos.)		
Hen housed	615	78.95 \pm 1.16
Hen day	-	82.3 \pm 1.10
Survivour	553	83.10 \pm 1.12

Table 2. Body weight (g) in S-5 generation of native chicken

Age	Female		Male	
	N	Mean \pm SE	N	Mean \pm SE
Day old	473	28.68 \pm 0.13	224	28.50 \pm 0.19
4 wks	311	236.0 \pm 2.04	217	245.6 \pm 3.24
8 wks	217	437.3 \pm 5.08	206	553.4 \pm 6.61
12 wks	102	736 \pm 11.5	103	881 \pm 16.4
16 wks	-	887 \pm 4.0	-	1164 \pm 13.9

Fertility and hatchability

Native chicken produced by pedigree mating and its performance was evaluated up to 16 weeks of age during S-5 generation. The number of sires and dams used for breeding was 50 and 250 (1:5). Good fertility and hatchability rates were observed in native birds in S-5 generation as well (Table 3).

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

Gens.	No. of hatches	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
					TES	FES
S-3	2	3275	90.04	2723	84.89	94.27
S-4	3	4196	91.71	3505	84.20	91.81
S-5	2	3473	91.50	2714	80.13	89.60

Growth traits

Results of body weight recorded at various intervals of both male and female birds, ASM and egg weight recorded at 28 and 40 weeks of age is presented in Table 4. Body weights at 8 and 16 weeks of age in both male and females decreased in S-5 generation over S-4 generation. The egg weight reduced marginally at 28 and 40 weeks in S-4 generation over S-3 generation (Table 4). Egg production up to 40 weeks of age of previous generation was maintained in the present generation also (Table 4).

Table 4. Summary of growth and production performances of native chickens for last three generations

Traits	Females			Males		
	S-5	S-4	S-3	S-5	S-4	S-3
Body weight (g)						
0 day	28.68	28.47	31.7	28.50	27.37	32.43
4 wks	236.0	168.4	260.4	245.6	171.3	247.92
8 wks	437.3	456.5	408.1	553.4	577.5	504.39
12 wks	886.9	917.3	881.6	1164	1248	1225
ASM (d)	142.6	154.2	-	-	-	-
Egg weight (g)						
28 wks	38.25	39.30	-	-	-	-
40 wks	43.04	43.37	-	-	-	-
EP 40 wks (Nos.)						
Hen Housed	78.95	79.20	-	-	-	-
Hen day	82.30	82.33	-	-	-	-
Survivors	83.10	84.90	-	-	-	-

Mortality in native birds

The mortality during 17-40 weeks in S-4 generation was very less when compared to the previous generation. Less mortality was observed during 0-8 and 9-16 weeks of age in S-5 generation (Table 5).

Performance evaluation of three way cross (NDR)

The native chickens which were multi-coloured in the earlier two generations were removed and birds which resemble *Tellichery* breed, the native breed of Kerala were retained for production of next generation. Accordingly IWN male birds were crossed with native female birds and the males of the two-way cross were selected and reared up to 40 weeks of age. RIR female birds were selected from the hatch produced from the parent stock available in the farm and are 24 weeks of age. The three way cross will be produced during the current year and will be evaluated.

B. Improvement of IWN and IWP strains of White Leghorn

The centre evaluated the S-31 generation of IWN and IWP strains up to 64 weeks of age and S-32 generation up to 8 weeks of age during the year 2019-2020.

Selection records

The summary of selection records for last five generations is presented in Table 6.

Incubation records

Fertility in IWN and IWP strain was more or less equal to previous generation. Hatchability on total and fertile egg set basis in IWN and IWP populations were higher as compared to previous generation (Table 7).

Mortality

The mortality of IWN and IWP birds of S-31 generation was 4.27 % and 7.87% respectively which was under the permissible limit during 17-64 weeks of age. The mortality of IWN and IWP birds of S-32 generation was 3.97% and 5.82% which was well within the specified limit of 8 % during 0-8 weeks. (Table 8).

Table 5. Mortality records of native birds for last three generations

Gens.	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-3	1675	35	2.10	1583	24	1.5	530	69	13.02
S-4	1559	14	0.89	1319	17	1.28	622	21	3.38
S-5	1215	30	2.47	1185	54	4.56	-	-	-

Table 6. Summary of selection records of IWN and IWP strains for last five generations

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

Table 7. Incubation records in last five generations

Generations	Strains	No. of hatches	No. of eggs set	Fertility (%)	No. of good chicks	Hatchability (%)	
						TES	FES
S-28	IWN	3	6189	93.97	4561	75.20	80.02
	IWP	3	5953	91.01	4076	69.86	76.76
	Control	1	667	85.76	522	79.91	93.18
S-29	IWN	3	5707	84.72	4244	74.55	87.96
	IWP	3	5794	83.44	4081	71.76	86.01
	Control	1	499	80.10	308	64.33	80.25
S-30	IWN	3	6156	88.55	4865	79.60	89.83
	IWP	3	7017	83.64	5110	73.34	87.69
	Control	1	590	84.74	470	90.60	98.75
S-31	IWN	3	6980	88.86	4903	70.94	86.66
	IWP	3	6404	85.09	4073	64.27	85.58
	Control	1	595	90.42	490	84.03	92.93
S-32	IWN	2	5091	89.13	4038	79.32	87.17
	IWP	2	4631	84.30	3258	70.35	85.65
	Control	1	605	29.09	174	28.76	51.03

Table 8. Mortality percentage at different ages in last five generations

Gen.	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	16.08
	IWP	2.09	2.35	7.70	17.84
	Control	1.20	4.40	5.40	8.84
S-31	IWN	6.57	4.05	3.43	4.27
	IWP	6.04	3.35	5.87	7.87
	Control	2.65	0	3.75	8.75
S-32	IWN	3.97	-	-	-
	IWP	5.82	-	-	-
	Control	4.59	-	-	-

Table 9. Egg production up to 64 weeks of age over last five generations in different strains

Gens.	IWN			IWP			Control		
	HH64	HD64	Sur64	HH64	HD64	Sur64	HH64	HD64	Sur64
S-27	264.8	270.8	272.0	255.1	262.2	262.4	218.6	218.6	218.6
S-28	256.7	261.2	263.8	261.3	266.7	268.2	177.6	192.1	194.0
S-29	254.9	260.2	261.6	261.2	267.9	268.8	174.1	184.9	187.9
S-30	245.7	263.2	268.8	247.8	262.9	267.8	176.8	185.4	186.0
S-31	263.1	267.7	268.7	247.7	252.2	259.2	174.5	180.7	184.5

Production performance

Least square means for different economic traits up to 64 weeks of age in both selected strains (IWN and IWP) and in control population during the S-31 generation is presented in Table 9. The hen day egg production up to 64 weeks of age in S-31 generation increased by 4.5 eggs in IWN and decreased by 10 eggs in IWP strains, respectively. The survivors' egg production up to 64 weeks of age remains the same in IWN and decreased by 8 eggs in IWP strains in S-31 generation when compared to previous generation.

Egg number

The birds in S-31 generation have completed the performance evaluation up to 64 weeks of age during the period under report (Table 10). The phenotypic response realized in S-31 generation for hen-housed, hen-day and

Table 11. ASM and body weights at 64 weeks of age in last five generations in different strains

Gens.	IWN		IWP		Control	
	ASM (d)	BW64 (g)	ASM (d)	BW64 (g)	ASM (d)	BW64 (d)
S-27	139.0	1547	139.1	1547	145.3	1440
S-28	144.5	1544	139.6	1585	153.1	1580
S-29	141.4	1498	139.9	1486	154.6	1484
S-30	139.6	1501	135.4	1543	156.2	1521
S-31	144.3	1501	139.5	1497	147.4	1495

survivors egg production up to 64 weeks of age were 17.48, 4.58 and -0.12 eggs in IWN strain (Response was positive for hen housed and hen day and negative for survivors). The respective values for IWP strain were -0.11, -10.7 and -8.58 eggs.

Table 10. Growth and production performances in S-31 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	896	1048±3.21	901	1082.17±2.95	160	970.5±7.63
40 wks	885	1432±4.46	845	1396.24±4.94	151	1397.05±14.95
64 wks	850	1502±5.51	786	1497.23±6.02	132	1495.64±18.24
ASM (d)	894	144.37±0.32	889	139.54±0.31	160	147.43±0.86
Egg weight (g)						
28 wks	878	50.29±0.11	819	50.05±0.12	155	46.64±0.28
40 wks	872	50.99±0.11	820	50.44±0.13	137	50.78±0.31
64 wks	833	51.89±0.13	720	53.73±0.16	93	55.59±0.45
EP to 40 wks (Nos.)						
Hen housed	902	121.2±0.65	847	124.43±0.74	160	94.91±2.03
Survivors'	885	122.6±0.54	859	124.09±0.76	154	96.84±1.95
Hen day: 17-40 wks	-	122.1±0.73	-	123.03±0.73	-	95.87±0.57
Hen day: 21-40 wks	-	121.0±0.86	-	120.8±0.86	-	95.9±0.57
EP to 64 wks (Nos.)						
Hen housed	902	263.1±1.46	902	247.67±2.44	159	174.50±4.48
Survivors'	864	268.7±0.97	847	259.24±2.00	145	184.49±4.75
Hen day	-	267.8±0.79	-	252.24±0.75	-	180.67±0.54
EP to 72 wks (Nos.)						
Hen housed	300	306.3±2.35	300	302.9±3.08	-	-
Survivors'	290	311.6±1.06	292	308.7±1.01	-	-
Hen day	-	309.7	-	306.2	-	-

Frequency distribution

The frequency of egg production up to 64 weeks of age in IWN and IWP strains in S-31 generation was maximum in the class interval of 261-280 while in control population it was maximum in the class interval of 181-200 and 221-240 (Table 12). The trend is similar to that of earlier generation except in case of control population.

Table 12. Frequency distribution of egg production up to 64 weeks of age (S-31 generation)

Class interval	IWN	IWP	Control
<100	0.021	0.061	0.108
101 - 120	0.003	0.004	0.057
121 - 140	0.003	0.008	0.089
141 - 160	0.006	0.017	0.095
161 - 180	0.001	0.015	0.108
181 - 200	0.010	0.017	0.184
201 - 220	0.019	0.033	0.108
221 - 240	0.053	0.065	0.184
241 - 260	0.165	0.163	0.057
261 - 280	0.367	0.356	0.013
281 - 300	0.333	0.244	0.00
>300	0.019	0.019	0.00

Table 13. Mean egg weights at various ages in last five generations in different strains

Strains	Gens	Egg weight (g)		
		28 wks	40 wks	64 wks
IWN	S-27	48.98	51.91	55.03
	S-28	48.00±0.10	52.16±0.10	54.16±0.37
	S-29	47.33±0.10	52.15±0.10	53.19±0.11
	S-30	48.11±0.13	52.03±0.16	52.56±0.17
	S-31	50.29±0.11	50.99±0.11	51.89±0.13
IWP	S-27	49.74	52.09	56.53
	S-28	48.22±0.09	51.46±0.11	55.3±0.13
	S-29	48.39±0.09	52.13±0.09	53.58±0.11
	S-30	48.62±0.11	52.11±0.15	53.80±0.18
	S-31	50.05±0.12	50.44±0.13	53.73±0.16
Control	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	56.28±0.48
	S-31	46.64±0.28	50.78±0.31	55.59±0.45

Table 14. Heritability estimates of different traits in IWN & IWP strains (S-31 generation)

Strains	Traits	Sire	Dam	Sire + Dam
IWN	ASM	0.433 ±0.142	0.406 ±0.149	0.419 ±0.078
	BW16	0.370±0.131	0.464±0.151	0.417 ±0.078
	BW40	0.538±0.159	0.346 ±0.148	0.442 ±0.079
	BW64	0.350 ±0.127	0.317±0.148	0.334 ±0.074
	EW28	0.463 ±0.148	0.622±0.155	0.542 ±0.083
	EW40	0.400 ±0.137	0.482 ±0.152	0.441 ±0.079
	EW64	0.299±0.120	0.472±0.154	0.386±0.078
	EP40	0.181±0.096	0.310±0.147	0.245±0.069
	EP64	0.084 ±0.076	0.202±0.145	0.143±0.063
	IWP	ASM	0.464±0.143	0.043 ±0.132
BW16		0.302±0.115	0.551 ±0.145	0.426±0.076
BW40		0.365±0.129	0.617±0.151	0.491±0.080
BW64		0.436±0.148	0.414±0.160	0.425±0.082
EW28		0.386±0.133	0.153±0.142	0.270±0.070
EW40		0.211±0.103	0.298±0.150	0.255±0.071
EW64		0.209±0.116	0.192±0.174	0.201±0.077
EP40		0.060±0.068	0.017±0.133	0.038±0.052
EP64		0.011±0.058	0.038±0.134	0.025±0.051

Table 15. Response to selection in primary and various correlated traits in S-31 generation

Sl. No.	Traits	Phenotypic		Genetic	
		IWN	IWP	IWN	IWP
1	Average age at first egg (d)	4.79	4.1	13.59	12.90
Body weight (g)					
2	16 wks	-33.0	-20.99	19.90	31.91
3	40 wks	-65.50	-104.04	48.86	10.32
4	64 wks	-0.20	-46.43	26.18	-20.45
Egg weight (g)					
5	28 wks	2.18	1.43	4.59	3.84
6	40 wks	-1.04	-1.67	1.19	0.56
7	64 wks	-0.67	-0.07	0.02	0.62
Egg number at 40 wks					
8	Hen Housed	0.93	-0.4	-6.95	-8.32
9	Hen Day	-0.77	-4.8	-7.58	-11.63
10	Survivors'	-1.9	-5.42	-9.17	-12.72
Egg number at 64 wks					
11	Hen Housed	17.45	-0.11	19.78	2.22
12	Hen Day	4.61	-10.7	9.37	-5.94
13	Survivors'	-0.14	-8.58	1.39	-7.05

Egg weight

The egg weight at 28 weeks of age increased by 2.18 and 1.43g in IWN and IWP strains in S-31 generation compared to last generation. However, egg weight at 40 and 64 weeks of age decreased by 1.04 and 1.67g in IWN and IWP strains S-31 generation compared to last generation.

Heritability estimates

In IWN strain, heritability estimate (S+D) of egg production up to 40 and up to 64 weeks was moderate in magnitude. The heritability estimate (S+D) was high in magnitude for ASM, EW28, EW40 and EW64. In egg production and egg weight traits, the heritability estimates from dam components were higher than sire component. The heritability estimates (S+D) were high in magnitude for BW16, BW40 and BW64.

In IWP strain, heritability estimate (S+D) of egg production up to 40 weeks and 64 weeks were low in magnitude. The heritability estimate (S+D) was moderate in magnitude for ASM, EW 28, EW40 and EW64. The heritability estimates (S+D) were high in magnitude for BW16, BW40 and BW64 in IWP line.

Response to selection

The phenotypic response for age at sexual maturity and egg weight at 28 weeks of age was positive in IWN and

IWP strain (Table15). Phenotypic response for hen day egg production up to 64 weeks of age was positive in IWN strain and negative in IWP strain.

The genetic response for egg weight at 28, 40 and 64 weeks and hen housed egg production up to 64 weeks was positive in both IWN and IWP strains in S-31 generation (Table 15).

Distribution of White Leghorn Cross bred Pullets to Scheduled Caste Beneficiaries

AICRP on Poultry Breeding, Mannuthy centre has distributed 1500 Athulya layers to 300 SC farmers under SCSP along with basic inputs like feeders, waterers, feed and medicines. Hon'ble Vice chancellor, KVAFS, Mannuthy distributed the pullets and other inputs to the beneficiaries. Hands on training on scientific poultry rearing were given to the beneficiary before distribution of the chicks.

Germplasm supply

Total germplasm supply from the centre was 1, 07,142 during the year 2019-20.

Revenue generation

The centre has generated the revenue of Rs.19.30 lakhs during the year 2019-20, which was 65.80% of the recurring expenditure (Rs.29.33 lakhs)



Anand Agricultural University, Anand (Gujarat)

Activities assigned

- Conservation, characterization and improvement of indigenous *Ankleshwar* chicken germplasm.
- The egg production up to 64 weeks of age continues to be the selection criterion in IWN and IWP strains.
- To maintain all the surviving birds of first hatch to record egg production till 72 weeks of age.
- To participate with IWN X IWP cross in RSPP tests being conducted by Govt. of India each year.
- Development of location specific chicken variety (egg type)

Action taken

- The S-0 generation of IWN and IWP strains was evaluated up to 72 weeks of age.
- The S-1 generation of IWN and IWP strains is being evaluated at present.
- The S-8 generation of IWD and IWK strains is being evaluated up to 40 weeks of age.
- *Ankleshwar* chicken was evaluated up to 40 weeks of age in base generation (S-0).
- *Ankleshwar* chicken (S-1 generation) was regenerated.

Achievements

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

Evaluation of *Ankleshwar* chicken germplasm (S-0 gen)

During the reporting period, birds of S-0 generation of *Ankleshwar* chicken were evaluated up to 40 weeks of age. Production performance of *Ankleshwar* chicken is presented in Table 16. A total of 1481 pullets were housed individually at 16 weeks of age and evaluated up to 40 weeks of age. Age at sexual maturity was 156.8 days in S-0 generation. Body weight at 16 and 40 weeks of age was 1003 and 1545 g, respectively.

Table 16. Production performance of *Ankleshwar* chicken (S-0 gen)

Traits	N	Mean \pm S.E.
ASM (d)	1441	156.8 \pm 0.40
Body weight (g)		
16 wks	1481	1002.9 \pm 2.89
40 wks	1405	1544.8 \pm 7.96
EP 40 wks (Nos.)	1405	71.06 \pm 0.62
Egg weight (g)		
28 wks	1215	37.05 \pm 0.09
40 wks	1136	43.76 \pm 0.11
Feed cons./bird (kg) 17-40 wks	-	15.98
Mortality (%) 17-40 wks	-	5.13

Egg production up to 40 weeks was 71.06. Egg weight at 28 and 40 weeks of age was 37.05 and 43.76 g, respectively. Mortality during 0-8, 9-16 and 17-40 weeks of age was 5.20, 2.11 and 5.13 %, respectively.

B. Improvement of IWN and IWP strains

During the period, S-0 generation of IWN and IWP strains was evaluated up to 72 weeks of age. The evaluation of S-1 generation of IWN and IWP strains is in progress.

Incubation records

The summary of incubation records of IWN and IWP strains during last two generations is presented in Table 17. Fertility and hatchability were better in control population as compared to IWN and IWP strains in S-1 generation.

Mortality

The summary of mortality records of IWN, IWP and Control population during last two generations is presented in Table 18. Mortality was under permissible limit during all the stages in IWN, IWP and Control population.

Table 17. Summary of incubation records of IWN, IWP and Control population during last two generations

Gens.	Strains	Eggs set	Fertility (%)	Hatchability (%)	
				TES	FES
S-1	IWN	1258	88.31	74.64	84.52
	IWP	1455	86.12	73.20	85.00
	Control	812	89.66	83.50	93.13
S-0	IWN	2181	94.96	85.92	90.49
	IWP	2207	92.48	85.23	92.16
	Control	807	90.33	78.31	86.69

Production performance of IWN, IWP strains and Control population (S-0 gen)

The hen day egg production up to 72 weeks of age was higher in IWN (321 eggs) than IWP (299 eggs) strain while egg weight was almost similar in both strains. Similarly, feed consumption from 17-72 weeks of age in IWN and IWP strains in S-0 generation was almost similar (Table 19).

Table 18. Summary of mortality in IWN, IWP and Control population during last two generations

Gen	Strains	0 to 8 wks	9 to 16 wks	17 to 40 wks	41 to 64 wks	17 to 64 wks
S-1	IWN	2.96	4.35	-	-	-
	IWP	4.83	0.56	-	-	-
Control		4.52	1.28	-	-	-
S-0	IWN	4.23	2.38	3.41	0.84	4.23
	IWP	3.02	1.13	2.10	0.66	2.74
Control		4.00	0.69	1.60	2.70	4.26

Growth performance of IWN and IWP strains and Control population

Production performance of IWN and IWP strains (S-1 gen) and Control population is presented in Table 20. A total of 372, 351 and 180 pullets of IWN, IWP and Control birds were housed individually at 16 weeks of age. Body weight at 16 weeks of age was slightly higher in IWN and IWP

Table 19. Performance of IWN and IWP strains and Control population in S-0 generation

Traits	IWN		IWP		Control	
	n	Mean ± S.E.	n	Mean ± S.E.	n	Mean ± S.E.
No. of pullets housed	615		620		188	
ASM (d)	610	143.7 ± 0.37	613	140.5 ± 0.33	186	148.8 ± 0.79
Body weight (g) at						
16 wks	615	1096 ± 3.88	620	1098 ± 4.12	188	1056 ± 5.69
40 wks	593	1468 ± 4.85	604	1555 ± 6.07	183	1460 ± 10.29
64 wks	529	1745 ± 5.49	543	1747 ± 7.14	180	1676 ± 14.88
72 wks	511	1678 ± 6.60	535	1700 ± 6.89	-	-
EP 40 wks (Nos.)						
Survivors'	593	122.7 ± 0.67	603	121.1 ± 0.83	183	101.6 ± 1.35
HH	615	120.4 ± 0.86	620	119.3 ± 0.97	188	100.3 ± 1.47
HD	-	121.87	-	120.41	-	101.36
EP 64 wks (Nos.)						
Survivors'	529	280.4 ± 0.78	543	266.9 ± 1.42	180	218.8 ± 2.99
HH	615	263.6 ± 2.16	620	250.5 ± 2.42	188	213.9 ± 3.43
HD	-	274.6	-	257.8	-	218.4
EP 72 wks (Nos.)						
HH	615	298.8 ± 2.73	620	284.7 ± 3.00	-	-
HD	-	320.8	-	298.5	-	-
Survivors'	511	324.5 ± 1.10	535	306.3 ± 1.89	-	-
Egg weight (g) at						
28 wks	602	50.76 ± 0.10	587	50.97 ± 0.11	181	49.64 ± 0.20
40 wks	589	52.33 ± 0.13	587	53.31 ± 0.13	175	51.62 ± 0.24
64 wks	504	55.30 ± 0.11	498	54.17 ± 0.12	158	55.95 ± 0.25
72 wks	461	55.09 ± 0.15	449	55.20 ± 0.18	-	-
Feed consumption / bird (kg)						
17-40 wks	-	16.37	-	16.16	-	17.69
17-64 wks	-	37.59	-	37.22	-	36.81
17-72 wks	-	44.28	-	43.95	-	-
Mortality (%)						
17-40 wks	-	3.41	-	2.10	-	1.60
17-64 wks	-	4.23	-	2.74	-	4.26
17-72 wks	-	6.34	-	4.35	-	-

Table 20. Performance of IWN and IWP strains and Control population in S-1 generation

Traits	IWN		IWP		Control	
	N	Mean ± S.E.	N	Mean ± S.E.	N	Mean ± S.E.
No. of pullets housed	372		351		180	
ASM (d)	372	133.8 ± 0.43	346	130.9 ± 0.40	180	145.7 ± 0.64
Body weight (g)						
16 wks	372	1060 ± 5.30	351	1068 ± 4.17	180	1044 ± 5.57
Egg weight (g)						
28 wks	370	50.27 ± 0.16	348	50.46 ± 0.13	174	50.08 ± 0.25
Feed cons./ bird (kg)						
0-8 wks	-	1.598	-	1.563	-	1.597
9-16 wks	-	3.456	-	3.466	-	3.421
Mortality (%)						
0-8 wks	-	2.96	-	4.83	-	4.52
9-16 wks	-	4.35	-	0.56	-	1.28

strains as compared to the control population. ASM in both strains were lesser than that of control population. Egg weights at 28 weeks of age were almost similar in all three populations (Table 20)

Performance of IWD and IWK strains

The performance of IWD and IWK strains in S-8 gen. is presented in Table 21. The S-8 generation of IWD and IWK strain was maintained and evaluated up to 40 weeks of age. Age at sexual maturity was almost similar in IWD and IWK strains, but it was lower as compared to S-7 generation in both the strains. Body weight at 16 weeks of age was almost similar in IWD and IWK strains. Egg production up to 40 weeks of age was higher in IWD and IWK strains as compared to S-7 generation in both the strains. Egg weight at 28 and 40 weeks of age was higher

in IWK as compared to IWD strain. Feed consumption was almost similar in both the strains during 17 to 40 weeks of age. Mortality was within permissible limit in both the strains during 17-40 weeks of age.

Germplasm supply

The centre supplied a total of 62,530 number of germplasm during the year 2019-20 to 1395 farmers, among them 149 farmers were directly benefited and 1246 farmers were benefited through IPDP centres, KVK and NGO.

Revenue generation

The center has generated the revenue of Rs. 21.73 lakhs during the reporting year (2019-20), which was 52.74 % of the total expenditure of feed cost (41.20 lakhs).

Table 21. Performance of IWD and IWK strains in S-8 generation

Traits	IWD		IWK	
	N	Mean ± S.E.	N	Mean ± S.E.
No. of pullets housed	200	-	200	-
ASM (d)	200	139.99 ± 0.58	200	138.36 ± 0.66
Body weight (g) at				
16 wks	200	1066 ± 5.25	200	1023 ± 6.61
40 wks	199	1653 ± 12.38	194	1590 ± 14.79
EP 40 wks (Nos.)				
Survivors'	199	116.74 ± 1.30	194	114.71 ± 1.31
HH	200	114.60 ± 1.42	200	110.70 ± 1.88
HD	-	114.90	-	111.91
Egg weight (g) at				
28 wks	170	50.08 ± 0.22	194	50.22 ± 0.16
40 wks	192	51.58 ± 0.17	186	52.03 ± 0.24
Feed consumption / bird (kg)				
0-8 wks	-	1.597	-	1.602
9-16 wks	-	3.50	-	3.558
17-40 wks	-	17.149	-	17.465
Mortality (%)				
0-8 wks	-	5.78	-	2.47
9-16 wks	-	2.92	-	1.35
17-40 wks	-	0.50	-	3.00

Karnataka Veterinary, Animal and Fishery Sciences University, Bengaluru (Karnataka)

Activities assigned

- Evaluation of local native chicken germplasm, crossing of F1 with PB-2 to produce F2 and farm evaluation of F2 cross.
- To improve PB-1 and PB-2 lines for growth and production traits
- To evaluate the control population to measure environmental trend.

Action taken

- Centre completed purification of local native chicken and evaluated for growth and production
- The S-4 generation of native chicks produced.
- Production traits of PB-1 (S-11), PB-2 (S-24) and Control lines were evaluated.
- The S-12 and S-25 generations of PB-1 and PB-2 along with Control lines were regenerated and evaluated for juvenile traits.
- Filed evaluation of PB-1 X PB-2 cross was undertaken.

Achievements

Collection, conservation and evaluation of native germplasm

Purification of native chicken germplasm was completed as per the technical programme for three generations. The solid black coloured and pure white plumage birds were culled and uniform attractive plumage coloured birds were retained. The egg production and other production traits in native birds (S-3) were evaluated. The average age at sexual maturity was 165.73 days. Egg weight at 28th week was 40.72 g and at 40th week was 42.86 g (Table 22). The average annual egg production was about 115 eggs. S-4 generation of native chicken was produced. The average body weight of day old and 8 week of native chicken was 28.42 and 468.8 g, respectively. The feed efficiency at 0-8 week was 3.15. The overall survivability percentage was 90.66 up to 0-8 weeks.

Table 22. Body weight and egg weight in native birds (S-3)

Traits	N	Mean ± SE
Body weight (g)		
20 wks	566	1208 ± 9.27
40 wks	539	1594 ± 14.87
52 wks	507	1624 ± 15.75
ASM (d)	289	165.7 ± 0.67
Egg weight (g)		
28 wks	300	40.72
40 wks	300	42.86

Conservation and utilization of elite germplasm

Selection records

The number of sires and dams contributed to next generation were 32 and 251 in PB-1, 16 and 158 in PB-2, respectively. The effective number of parents was 116 in PB-1 and 70 in PB-2. The rate of inbreeding was 0.0039 and 0.0057 in PB-1 and PB-2 populations, respectively. Summary of selection records of PB-1 and PB-2 are presented in Table 23. In both PB-1 and PB-2, selection intensity decreased compared to previous generation.

Table 23. Summary of selection records

Parameters	PB-1		PB-2	
	S-11	S-12	S-24	S-25
Sires	32	32	20	16
Dams	254	256	158	128
Sires contributed	32	32	20	16
Dams contributed	254	251	158	128
Effective number	114	116	71	70
Rate of Inbreeding	0.0043	0.0039	0.0056	0.0057
SD for male (g)	193	159	152	112
SD for female (g)	74	76	61	52
Average selection differential (g)	87	94	71	83
Selection intensity (σ)	0.55	0.45	0.47	0.41

Incubation records

The fertility and hatchability records of PB-1, PB-2 and control populations are presented in Table 24. During the current year, a total of 1420, 705 and 113 good chicks were hatched in PB-1, PB-2 and control populations, respectively. Fertility and hatchability slightly reduced as compared to last generation in all three lines, however hatchability on FES was almost similar in PB-1 and PB-2 and better in Control.

Table 24. Incubation records for PB-1, PB-2, and control line

Gen.	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-11	2391	89.21	1851	79.72	89.36
S-12	1850	88.65	1420	78.81	88.90
PB-2					
S-24	663	88.24	500	76.92	87.18
S-25	961	84.18	705	74.30	88.26
Control					
S-24	210	83.81	150	72.85	86.93
S-25	189	66.14	113	60.84	92.00

Mortality

The mortality in the present generation during 0 to 5 weeks was 1.9, 1.84 and 5.31% in PB-1, PB-2, and control line, respectively. Mortality during 0-5 weeks of age increased in PB-1 and control compared to previous generation, while decreased in PB-2 (Table 25).

Table 25. Mortality for PB-1, PB-2 and control line (%)

Gen.	0-5 wks	6-16 wks	17-40 wks
PB-1			
S-11	1.51	2.74	7.79
S-12	1.90	0.93	5.79
PB-2			
S-24	5.60	2.33	7.27
S-25	1.84	6.07	NC
Control			
S-24	2.00	2.04	0.00
S-25	5.31	7.48	NC

NC –Not completed

Body weight and feed efficiency

The day old body weight recorded in PB-1, PB-2 and Control lines were 43.39, 42.92 and 39.11 g, respectively. Five week body weight maintained in PB-1 line where as decreased in PB-2 and control lines as compared to previous generation. In the current year, feed conversion

ratio showed marginal improvement in PB-2 and control lines over previous generation and was similar in PB-1 (Table 26).

Table 26. 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-11	42.82 (1851)	1246 ± 3.68 (1823)	2.09
S-12	43.39 (1420)	1247 ± 3.81 (1393)	2.09
PB-2			
S-24	43.01 (500)	1126 ± 6.99 (472)	2.35
S-25	42.92 (705)	1093 ± 6.40 (692)	2.21
Control			
S-24	40.00 (150)	662.7 ± 10.8 (147)	3.84
S-25	39.11 (113)	717.6 ± 12.8 (107)	2.38

* Figures in parenthesis indicate number of observations

Frequency distribution of 5 week body weight

Frequency distribution for body weight at 5 weeks of age in both the selected lines is presented in graphical form below (Fig. 1)

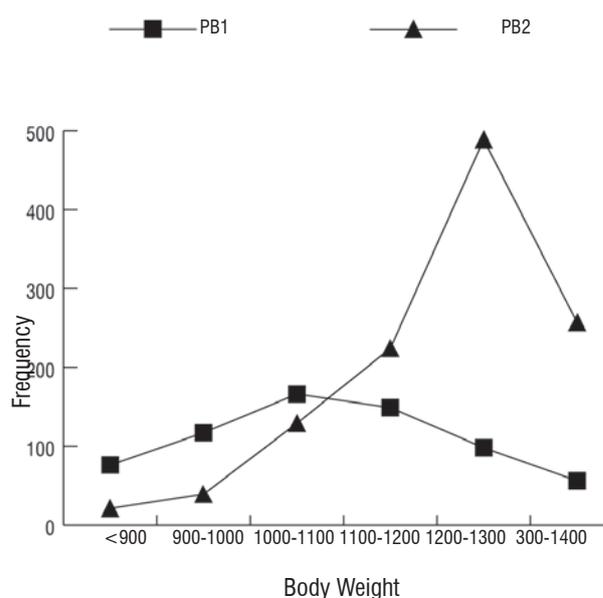


Fig 1. Frequency distribution of 5th week body weight in PB-1 and PB-2 lines

Table 27. Adult body weight at 20 and 40 wks of females in different lines

Gen.	Body weight (g)	
	20 wks	40 wks
PB-1		
S-10	2353±13.70 (358)	3160±29.34 (127)
S-11	2390±22.85 (450)	3330±24.82 (251)
S-12	2230±19.41 (515)	NC
PB-2		
S-23	2205±17.59 (168)	3200±35.10 (110)
S-24	2550±28.91 (218)	3130±32.10 (127)
S-25	2480±40.99 (221)	NC
Control		
S-23	1880±56.32 (45)	2980±81.43 (27)
S-24	2120±42.95 (38)	2650±52.92 (32)
S-25	1720±44.95 (42)	NC

* Figures in parenthesis indicate number of observations

Production performance

The production performance in PB-1, PB-2 and control lines up to 52 weeks of age over last two generations are presented in Tables 27, 28 and 29. The average body weight at 20 week recorded in PB-1 (S-12) was 2390±22.85 g. Corresponding values in PB-2 (S-24) was 2550±28.91 g, respectively. The body weight at 20 week of age increased in PB-2 line in the present generation, more than the target body weight. Proper feed restriction should be followed to maintain the target body weight.

The ASM recorded in S-11 of PB-1 and S-24 of PB-2 and control lines were 191.90±0.69, 174.15±1.18 and 183.26±0.72 days, respectively. Decrease of ASM was observed in PB-2 line, whereas it increased in PB-1 line as compared to previous generation.

Table 28. Age at sexual maturity and egg weight in different lines

Gen.	ASM (days)	Egg wt (g) at 32 wks
PB-1		
S-10	187.64 + 0.65 (256)	55.53±0.39 (150)
S-11	191.90 + 0.69 (256)	60.04±0.51 (100)
PB-2		
S-23	179.46±0.65 (160)	55.20±0.42 (120)
S-24	174.15±1.18 (128)	56.65±0.52 (100)
Control		
S-23	183.86±1.76 (29)	50.97±1.07 (30)
S-24	183.26±0.72 (45)	48.44±0.51 (45)

* Figures in parenthesis indicate number of observations

The average egg production at 40 weeks of age (survivor basis) in PB-1, PB-2 and control lines were 53.10±0.67, 53.11±0.84 and 57.40±0.78 eggs, respectively. Corresponding production at 52 weeks of age were 86.98±0.94, 88.64±1.40 and 100.78±1.58 eggs, respectively. The egg production up to 40 and 52 weeks of age decreased in all three lines.

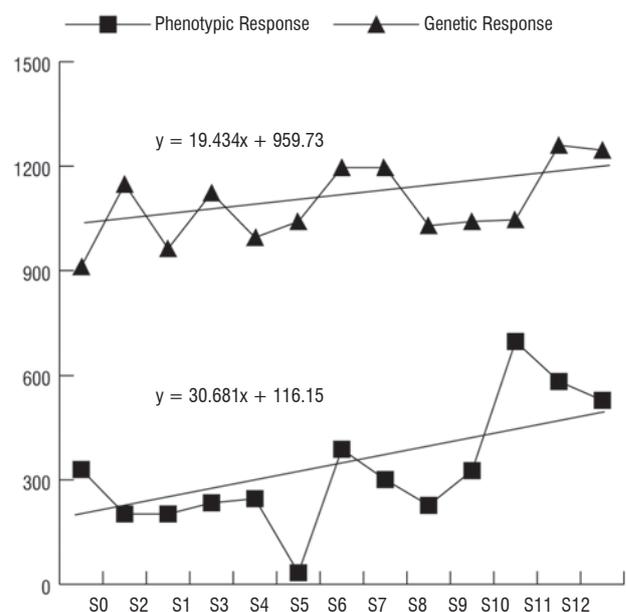
Table 29. Production performance of females

Gen.	Egg production (Nos.)	
	40 wks	52 wks
PB-1		
S-10	63.81±0.54 (254)	114.22±0.75 (245)
S-11	53.10±0.67 (251)	86.98±0.94 (240)
PB-2		
S-23	61.25±0.99 (158)	103.89±1.52 (148)
S-24	53.11±0.84 (127)	88.64±1.40 (112)
Control		
S-23	63.48±1.39 (29)	109.48±2.28 (25)
S-24	57.40±0.78 (32)	100.78±1.58 (32)

* Figures in parenthesis indicate number of observations

Response

The average phenotypic and genetic response of 5 week body weight over 13 generations in PB-1 was 19.42 and 30.68 g, respectively (Fig. 2 and 4). Corresponding values for egg production up to 40 weeks of age over 12 generations in PB-1 was -0.61 and -1.61 eggs. The average phenotypic and genetic response of 5 week body weight in PB-2 over 14 generations was 9.89 and 19.45 g, respectively (Fig. 3 and 5). Corresponding values for egg production in PB-2 up to 40 week over 13 generations was -0.83 and -1.25 eggs.

**Fig 2. Genetic and phenotypic response to 5 week body weight in PB-1**

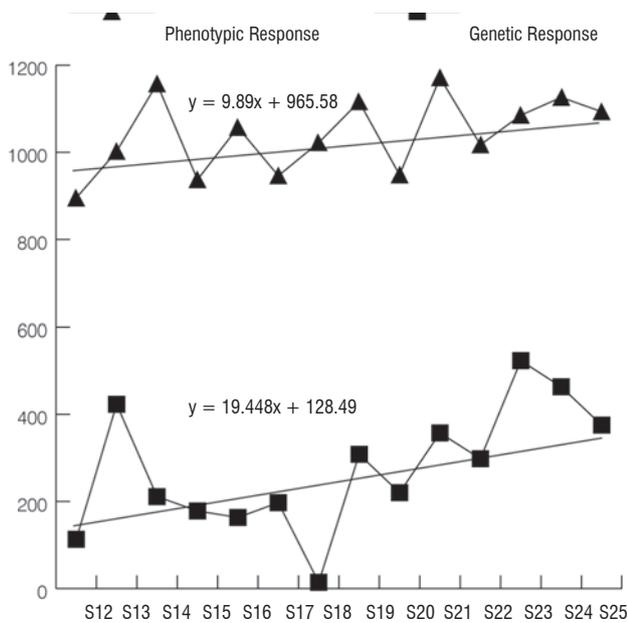


Fig 3. Genetic and phenotypic response to 5 week body weight in PB-2

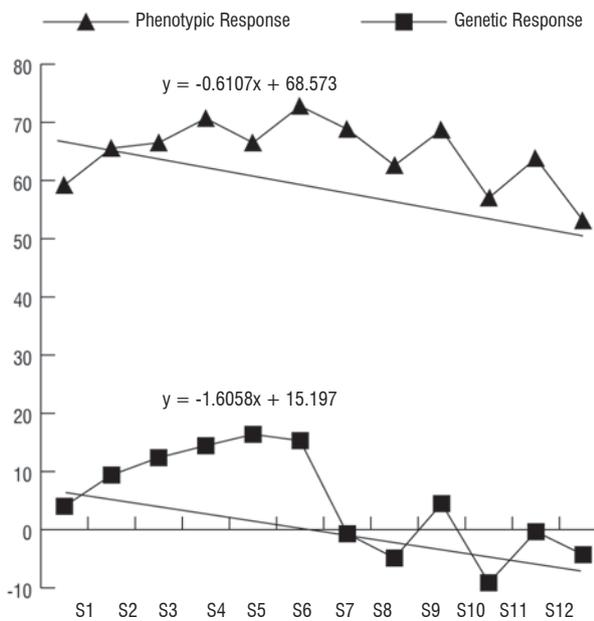


Fig 4. Genetic and phenotypic response of egg production up to 40 wks in PB-1

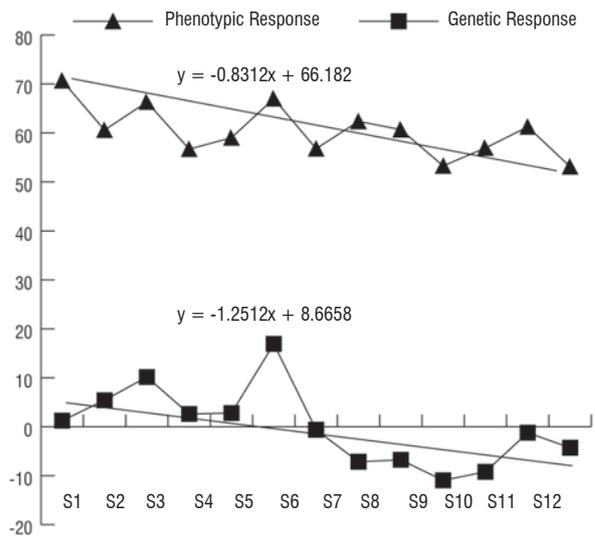


Fig 5. Genetic and phenotypic response of egg production up to 40 wks in PB-2

% survivability. The farmer got a net profit of Rs. 5500/ by rearing a unit 160 Raja-II birds.

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

No. of chicks reared	:	160
Average 6 th week body weight	:	1.48 kg
Average 7 th week body weight	:	1.92 kg
FCR	:	2.10
Survivability	:	98.00%

1. Expenditure

Cost of chick 160 X Rs.16	=	2,560.00
Cost of feed (approx) up to 6 weeks 157 birds X 3.12kg feed X Rs.28	=	13,715.00
Other expenditure 150 birds X Rs.10	=	1,500.00
Total Expenditure	=	17,727.00

2. Income

157 birds X 1.48kg X Rs.100	=	Rs.23,236.00
Profit (approx) 23,236- 17,727	=	Rs 5,509.00

Germplasm supply

A total of 2,03,328 Nos. germplasm (1,98,338 day old chicks and 4,990 hatching eggs) were supplied to farmers and other stakeholders (297 farmers) during the current year.

Revenue generation

During the year 2019-20, the centre generated revenue of Rs. 58.47 lakhs which was 176% of expenditure on feed cost (Rs. 33.26 lakhs).

Random Sample Poultry Performance Test

The centre participated in the 51st RST for broilers at Gurgaon, Haryana during 2019. The average body weights of Raja-II (PB-1 X PB-2) were 1680 and 1984 g, respectively with a feed efficiency of 2.02 (0-6 weeks) and 2.01 (0-7 weeks).

Field Evaluation of PB-1 X PB-2 Cross

PB-1 x PB-2 cross (Raja -II) was evaluated under field condition. A total of 160 Raja II chicks were reared under intensive management. The body weight at 6 and 7 weeks was 1480 and 1920 g with 2.1 FCR (up to 7 weeks) and 98



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

Activities 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

- Centre evaluated the S-4 generation of *Punjab Brown* chicken germplasm.
- PB-2 X Local native chicken cross evaluated.
- The centre regenerated S-12 generation of PB-1 and S-44 generation of PB-2 population.

Achievements

Collection, conservation and evaluation of native germplasm

A total of 1576 fertile eggs of *Punjab Brown* were set for hatching in S-4 generation. The percent fertility was 95.49%. The hatchability percent on TES and FES were 93.34 and 97.74, respectively. The body weight of *Punjab Brown* chicks at 4 and 8 weeks of age were 500.5, 720.5 g in males and 452.3, 664.9 g in females, respectively (Table 30). The mortality percent in native chicken in different age groups of 0-8, 9-20, 21-40 were 4.11, 2.69 and 1.81, respectively. ASM of *Punjab Brown* was 172.43 days and egg production up to 40 weeks was 67.26 eggs, which was increased by 11 eggs compared to previous generation. Egg weight at 40 weeks of age was 49.85 g.

Field evaluation of dual cross (PB-2 x Native) was completed. The body weight of cross at 4, 8 and 20 weeks of age were 367.12, 839.12 and 1736 g, respectively. The mortality percent in dual purpose cross in different age groups of 0-8, 9-20, 21-40 were 5.69, 3.81 and 3.53, respectively in farm. ASM and egg production up to 40 weeks in was 179 days and 58.63 eggs, respectively. There

Table 30. Comparative performance of *Punjab Brown* (S-4) and its cross with PB-2

Traits	<i>Punjab Brown</i> (Male)		<i>Punjab Brown</i> (Female)		PB2 (M) x <i>Punjab Brown</i> (F) in Field	
	N	Mean ± SE	N	Mean ± SE	N	Mean
Body weight (g)						
4 wks	614	500.5±3.90	667	452.3±3.24	100	367.12
8 wks	614	720.5±5.76	667	664.9±5.44	100	839.12
16 wks	614	1544±15.94	667	1286±7.58	80	1736
20 wks	304	2265±14.24	631	1699±10.98	80	2019
40 wks	125	3028±40.05	567	2336±10.14	60	2893
FCR (0-8 wks)	-	-	3.8	-	-	3.5
ASM (d)	-	-	579	172.43±0.69	39	179
EW at 40 wks (g)	-	-	555	49.85±0.15	27	51.15*
EP 40 wks (Nos)	-	-	555	67.26±0.68	27	58.63

* EW at 36 wks

was an increase of 3 eggs in 40 weeks egg production of the cross compared to last generation.

Conservation and utilization of elite germplasm

Selection records

Summary of selection records over the last two generations for PB-1 and PB-2 are presented in Table 31. The PB-1 and PB-2 populations were reproduced utilising 70 sires and 350 dams during S-12 and S-44 generations, respectively. The intensity of selection maintained in the current generation as compared to previous generation in both the lines.

Table 31. Summary of selection records in last two generations in PB-1 and PB-2

Parameters	PB-1		PB-2	
	S-11	S-12	S-43	S-44
Sires	70	70	70	70
Dams	400	350	410	350
Sires contributed	70	70	70	70
Dams contributed	400	350	410	350
Effective number	238	233.3	239	233.33
Rate of inbreeding	0.0021	0.0021	0.002	0.0021
Average Expected selection differential	128	326.6	157.5	205.6
Selection intensity (σ)	M	3.17	3.14	3.14
	F	2.98	3.01	2.91
Expected response	23.04	39.19	23.63	24.67

Incubation records

During the current generation, a total of 3021, 2219 and 317 good chicks were hatched in PB-1, PB-2 and Control populations, respectively (Table 32). The fertility was 89.01, 92.27 and 83.67 % in PB-1, PB-2 and control lines. The hatchability on total eggs set was 83.17, 87.35 and 72.65% in PB-1, PB-2 and control lines, respectively. The fertility decreased in PB-2 line as compared to last generation.

Table 32. Incubation records for PB-1, PB-2 and control line

Gen./year	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-11	3694	89.60	2995	84.14	93.90
S-12	3649	89.01	3021	83.17	93.44
PB-2					
S-43	4517	96.19	3548	82.31	85.57
S-44	2625	92.27	2219	87.35	94.67
Control					
2018-19	350	82.57	275	78.57	95.16
2019-20	490	83.67	317	72.65	86.83

Mortality

The mortality reported in PB-1, PB-2 and control lines were 5.33, 5.72 and 4.42%, respectively during 0-5 week (Table 33). During grower period mortality of 5.06, 4.20 and 4.29% was recorded in PB-1, PB-2 and control, respectively. Mortality slightly decreased across all age groups in all the lines.

Table 33. Mortality percentage at different ages in PB-1, PB-2 and control lines

Gen.	Mortality (%)		
	0-5 wks	6-20 wks	21-40 wks
PB-1			
S-11	5.77	5.95	4.84
S-12	5.33	5.06	5.33
PB-2			
S-43	4.68	5.85	5.00
S-44	5.72	4.20	3.64
Control			
2018-19	5.46	6.38	4.26
2019-20	4.42	4.29	2.24

Body weight

During current generation the average body weight at 5 weeks of age was 1125, 1049 and 774.8 g in PB-1, PB-2 and Control lines, respectively (Table 34). The feed efficiency up to 5 weeks of age slightly improved in PB-2 line over last generation. The body weight at 5 weeks of age decreased in all the three lines as compared to previous generation.

Table 34. Body weight (g) and feed efficiency at 5 weeks during last two generations

Gen./year	BW 5 wk	Feed efficiency (upto 5 wks)
PB-1		
S-11	1166±4.06 (2368)	1.91
S-12	1125±3.59 (2860)	1.95
PB-2		
S-43	1071±2.96 (2818)	1.94
S-44	1049±7.49 (1796)	1.93
Control		
2018-19	826.0±10.59 (141)	2.02
2019-20	774.8±9.98 (221)	1.97

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 6). 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.

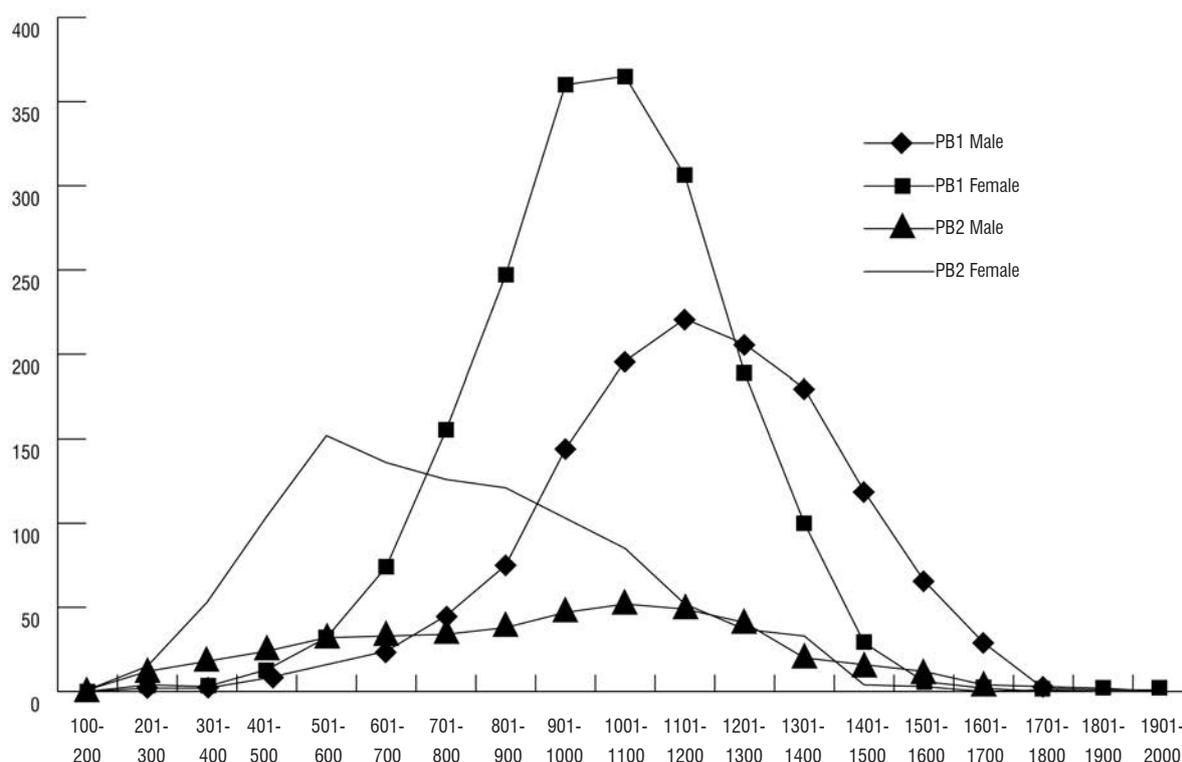


Fig. 6. Frequency distribution of BW 5 wks in PB-1 male and female lines and PB-2 male and female lines.

Production traits

The production traits were recorded up to 52 weeks of age in PB-1, PB-2 and control lines. There was increase in body weight of PB-1 and PB-2 lines at 20 weeks of age (Table 35), which needs to be maintained between 2150-2200 g for realizing the optimum production during laying phase. Centre needs to implement and monitor the feed restriction program effectively to maintaining the required body weight at 20 weeks of age.

Table 35. Adult body weight in PB-2, PB-1 and control lines

Gen./ year	Body weight (g)	
	20 wks	40 wks
PB-1		
S-11	2205±10.16 (1100)	3459±35.19 (400)
S-12	2331±10.22 (1142)	2956±17.16 (925)
PB-2		
S-43	2174±8.58 (651)	2988±11.96 (410)
S-44	2280±11.63 (358)	2879±16.28 (324)
Control		
2018-19	2042±46.90 (47)	2856±57.16 (43)
2019-20	2110±38.28 (88)	2982±42.12 (82)

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

decreased in PB-2 and control and increased in PB-1 line as compared to previous generation. Egg weight at 52 weeks increased in PB-1, PB-2 and control lines. There was decline in the egg production up to 40 weeks of age in PB-1 and PB-2 lines as compared to last generation (Table 37), however, the egg production revived and maintained similar to the last generation at 52 weeks of age.

Table 36. ASM and egg weights performance at different ages

Gen./ year	ASM (d)	Egg weight (g)	
		36 wks	52 wks
PB-1			
S-11	153.46±0.82 (314)	54.42±0.12 (420)	60.52±0.26 (381)
S-12	184.35±0.46 (1080)	55.40±0.15 (811)	64.08±0.26 (231)
PB-2			
S-43	171.15±1.29 (586)	54.15±0.12 (430)	57.46±0.24 (267)
S-44	169.63±1.59 (358)	52.10±0.31 (162)	64.01±0.26 (145)
Control			
2018-19	181.0±5.43 (45)	54.43±0.70 (30)	57.42±0.66 (44)
2019-20	176.0±9.03 (74)	52.41±0.49 (46)	60.01±0.32 (41)

Table 37. Egg production performance at 40 and 52 weeks of age

Gen./year	Egg Production (Nos.)	
	40 wks	52wks
PB-1		
S-11	64.66±0.77 (400)	112.38±1.98 (386)
S-12	59.38±0.58 (834)	112.12±0.45 (371)
PB-2		
S-43	68.61±0.82 (410)	112.75±1.29 (237)
S-44	57.39±1.61 (358)	113.37±1.01 (289)
Control		
2018-19	55.36±2.53 (44)	89.36±2.55 (44)
2019-20	58.65±1.81 (55)	95.87±2.79 (51)

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 38.

Table 38. Mean and SE for egg quality traits at 36 weeks of age (n=30)

Egg quality traits	Strains		
	PB-1	PB-2	Control
Egg weight (g)	55.40±0.15	52.10±0.31	52.41±0.49
Egg Length (cm)	5.58±0.09	5.53±0.13	5.57±0.09
Egg Width (cm)	4.17±0.03	4.20±0.03	4.18±0.03
Shape Index	76.54±0.66	77.01±0.67	75.17±0.51
Shell thickness (mm)	38.41±0.49	37.67±0.75	37.55±0.71
Albumen height (mm)	8.05±0.31	8.01±0.27	8.10±0.19
Yolk height (mm)	16.53±0.12	16.68±0.14	16.51±0.13
Yolk diameter (mm)	3.87±0.02	3.88±0.03	3.90±0.04
Yolk index	4.32	4.30	4.23
Haugh unit	91.07	91.75	92.14

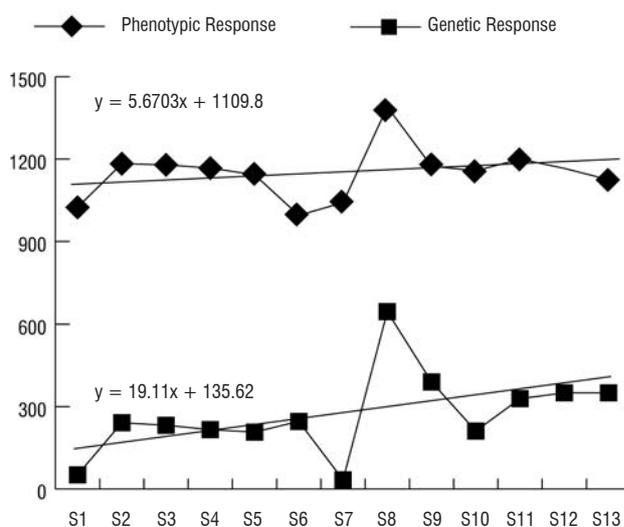
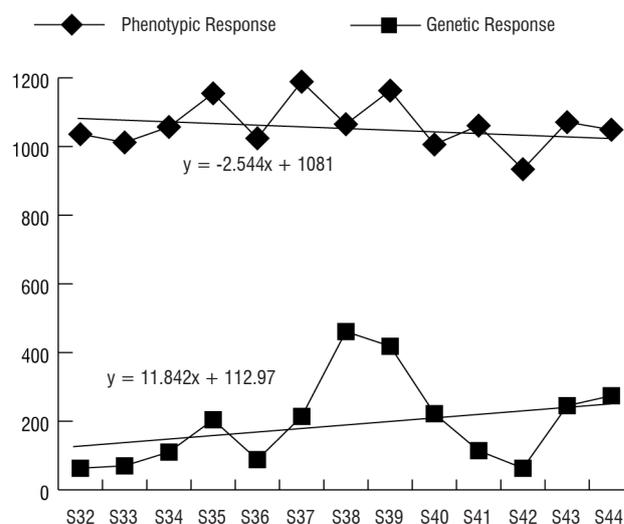
Genetic parameters

The heritability estimates for five week body weight and 40 week egg production was 0.12 and 0.11 based on the

half-sib analysis (Sire basis). The heritability of different traits in PB-2 line is low in magnitude.

Genetic and phenotypic response

The genetic and phenotypic response over the generations in PB-1 and PB-2 is presented in Fig. 7, 8, 9 and 10. The phenotypic and genetic response was -2.54 and 11.84 g for 5 week body weight and -1.62 eggs and 0.51 eggs for 40 week egg production, respectively in PB-2 population over last 13 generations. The phenotypic and genetic response for 5 week body weight was 5.67 and 19.11 g, respectively in PB-1 over last 13 generations. The phenotypic response of egg production up to 40 weeks of age was -1.14 eggs and genetic response was 1.48 egg over 12 generations.

**Fig. 7 Genetic and phenotypic response to 5 week body weight in PB-1 at Ludhiana****Fig. 8. Genetic and phenotypic response to 5 week body weight in PB-2 at Ludhiana**

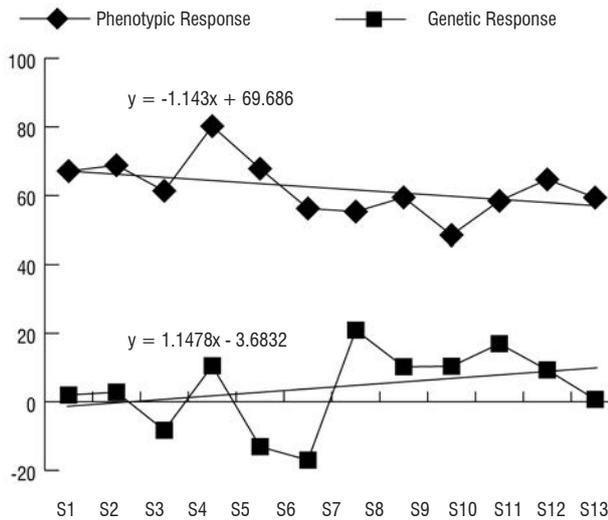


Fig. 9. Genetic and phenotypic response to EP 40 wks in PB-1 at Ludhiana

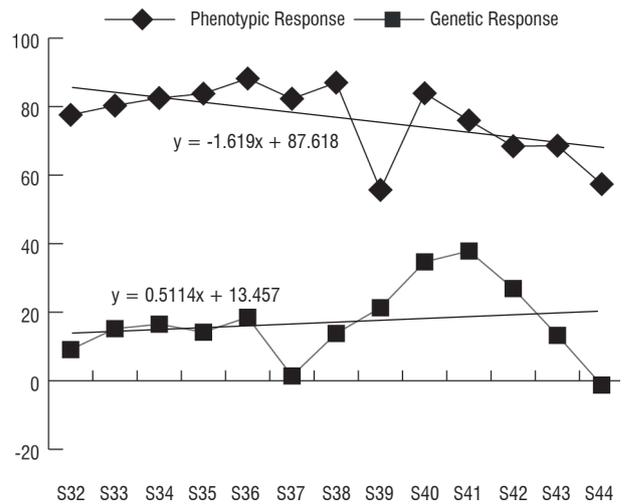


Fig. 10. Genetic and phenotypic response to EP 40 wks in PB-2 at Ludhiana

Evaluation of IBL-80

A total of 95 day old chicks of IBL-80 (PB-1x PB-2) birds were reared on intensive farming with full feeding up to six weeks of age at a farmer’s farm. The farmer earned a net profit Rs. Rs. 3000/- at Rs. 31.50 per bird.

Average body weight (g) per bird	:	1,575
Total feed consumed per bird (g)	:	3150
Cost of feed @ Rs.25 per Kg	:	78.75
Receipts (sold at Rs.75/kg live wt.)	:	110.25
Profit per bird (Rs.)	:	31.50

Germplasm supply

A total of 94,699 Nos. germplasm were distributed to farmers.

Revenue generation

During the year 2019-20, the centre generated revenue of Rs. 21.37 lakhs which was 87 % of expenditure on feed (Rs. 24.67 lakhs)



ICAR-Central Avian Research Institute, Izatnagar (Uttar Pradesh)

Activities assigned

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

Action taken

- The S-4 generation of the native chicks was reproduced and the body weights at different age and confirmatory parameters were recorded.
- During the year the centre evaluated CSML and CSFL populations upto 52 wks of age in S-17 generation.
- A random bred control line was also evaluated to measure environmental fluctuations.

Achievements

Collection, conservation and evaluation of native germplasm

During the year, S-4 generation of the native chicks was evaluated for growth and confirmatory traits up to 12 weeks of age. A total of 774 good chicks were hatched in S-4 generation with fertility, hatchability on TES and on FES of 85.74, 64.93 and 75.73%, respectively. The body weight of local native chicken germplasm at 6, 8 and 12 weeks of age were 373.5, 617.5 and 941.1 g, respectively. Shank length, keel length and breast angle in Desi birds at 8 weeks of age were 5.97 ± 0.12 cm, 6.94 ± 0.12 cm and $33.07 \pm 0.69^\circ$, respectively. At 20 weeks of age breast angle, shank length and Keel length, were 43.17°, 8.80 cm, and 10.47 cm, respectively in Desi.

The Desi and CSML X Desi cross were obtained and different parameters were recorded. The body weights and conformation traits in Desi, CSMLX Desi and CSML are presented in Table 38. Carcass traits, CMI (foot web index) and humoral immunity (HI titre against NDV) are given below. The immunity traits in Desi were higher compared to CSML purebred.

Table 38. Body weights and conformation traits at different ages in Desi and crosses

Trait	Desi	CSML X Desi	CSML
Body weight (g)			
6 wks	373.5±9.98 (100)	547.9±7.77 (107)	1197±16.05 (114)
8 wks	617.5±15.24 (100)	810.7±13.1 (101)	1704±22.75 (110)
12 wks	941.1±20.91 (80)	1325±27.56 (90)	3186±75.2 (81)
Shank length (cm)			
8 wks	5.97±0.12 (30)	6.68±0.13 (30)	7.92±0.08 (30)
12 wks	5.90±0.11	8.54±0.13	7.68±0.12
16 wks	8.35±0.15	9.01±0.18	9.46±0.15
20 wks	8.80±0.13	9.19±0.19	11.16±1.34
Keel length (cm)			
8 wks	6.94±0.12 (30)	7.79±0.13 (30)	9.69±0.08 (30)
12 wks	9.04±0.16	9.86±0.11	12.47±0.15
16 wks	9.79±0.15	11.02±0.14	12.87±0.17
20 wks	10.47±0.14	11.52±0.18	13.68±0.19
Breast angle (°)			
8 wks	33.07±0.69 (30)	35.43±0.78 (30)	45.03±0.56 (30)
12 wks	37.73±0.54	40.67±0.66	47.37±0.45
16 wks	42.80±0.62	42.00±0.78	50.57±0.55
20 wks	43.17±0.57	41.60±0.71	53.77±0.49
FCR (0-6 wks)	3.26±0.08 (100)	2.73±0.04 (107)	1.97±0.06 (114)
Cell mediated immunity at 6 wks			
Foot web Index (mm)	0.23±0.02 (12)	0.22±0.02 (12)	0.17±0.03 (12)
Humoral immune response			
HI Titre (log ₂)	4.33±0.33 (12)	3.78±0.4 (12)	3.24±0.32 (12)
Carcass traits (8 wks)			
Live wt, g	835.25±66.2	1248.13±66.21	1843.88±91.63
Dressing %	66.78±0.28	62.06±0.54	77.91±0.34
Giblet %	5.90±0.22	5.99±0.2	5.31±0.32

Table 39. Mortality (%) records for last two generations

Gen.	0-5 wks		6-20 wks
	CSML		
S-16	6.68		17.64
S-17	10.88		10.55
Gen.	CSFL		6-20 wks
	CSML		
S-16	5.37		14.18
S-17	7.07		12.54
Gen.	Control		6-20 wks
	CSML		
S-16	6.15		-
S-17	8.82		-

Conservation and utilization of elite germplasm

The regeneration of S-18 was in progress with 50 sires and 300 dams in CSML and CSFL.

Mortality

The mortality up to 5 weeks of age increased in the current year as compared to previous year in all the three lines (Table 39). There is a need to control mortality in CSML and CSFL in 6-20 week age group.

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 40. The body weight in both CSML and

Table 40. Body weight and FCR at 5 weeks during the last two generations

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

CSFL maintained in the present generation compared to previous.

Production traits

The body weight at 20 weeks was higher improper indicating improper restricted feeding. The average ASM of CSML and CSFL increased marginally in the current generation as compared to last generation (Table 41). The 20 week body weight was more than the target body weight which needs to be maintained between 2150 -2200 by strictly monitoring the feed restriction schedule. The 40 week egg production was maintained in both CSML and CSFL lines similar to the last generation (Table 42).

Table 41. 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-16	2505±23.67	2488±23.81	2312±21.22	176.30	176.50	-
S-17	2512±19.90	2490±20.23	2329±22.45	178.1	178.2	-

Table 42. Production performance of females in last two generations

Gen.	40 wks E.wt (g)			40 wks HHEP (Nos.)		
	CSML	CSFL	Control	CSML	CSFL	Control
S-16	63.96	63.77	-	68.0	68.20	41.32
S-17	64.96±1.1	67.19±0.83	-	68.6	68.30	-

Egg quality traits

Egg quality traits measured in CSML and CSFL in S-17 generation are presented in Table 43.

Random sample poultry performance test

Centre participated in 52nd RSPPT, Gurgaon and CARIBRO-Dhanraja was got FCR of 1.78.

Germplasm supply

A total 38,833 germplasm (24,514 day old chicks and 14,319 fertile eggs) was supplied to the 39 beneficiaries of farmers and other stakeholders during the current year.

Revenue generation

During the year 2019-20, the centre generated revenue of Rs. 29.79 lakhs by distributing the germplasm.

Table 43. Egg quality traits of CSML & CSFL during 2019-20 (S-17)

Traits	CSML (42 wks)	CSML (52 wks)	CSFL (42 wks)	CSFL (52 wks)
Egg weight (g)	64.96±1.1	61.35±0.93	67.19±0.83	60.89±0.98
Egg length (mm)	60.03±0.56	72.28±0.32	59.67±0.4	56.96±0.48
Shape index	84.9±1.2	84±1.2	76.4±1.2	80±0.45
Albumen height (mm)	6.8±0.17	7.9±0.17	6.81±0.18	7.81±0.24
Yolk height (mm)	22.6±0.16	18.63±0.18	21.49±0.7	17.93±0.18
Yolk index (height/width)	0.51±0.39	0.45±0.38	0.47±0.35	0.42±0.18
Egg shell thickness (mm)	0.36±0.00	0.44±0.00	0.37±0.00	0.44±0.59
Haugh unit	80.8±1.02	88.6±1.02	80.2±0.00	88.22±0.34



Odisha University of Agriculture and Technology, Bhubaneswar (Odisha)

Activities assigned

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

Action taken

- *Hansli* chicken was evaluated for production traits in S-3 and juvenile traits in S-4 generation.
- During the period S-8 generation of CSFL and CSML were raised and evaluated for juvenile traits.
- During the current year, S-7 generation of CSFL and CSML lines were evaluated for production traits.

Achievements

Collection, conservation and evaluation of native germplasm

A total of 142 good chicks of S-4 generation of *Hansli* chicken were hatched and average body weight at day old was 32.95 ± 0.06 g. The egg production up to 40 week in S-3 generation was 25.09 eggs with an egg weight of 43.55 g (Table 44). Body weight at 20 and 40 weeks of age was 1561 and 3029 g, respectively. Mortality during 9-20 and 21-40 weeks was 2.08 and 3.65 %, respectively. ASM increased by 3 days compared to previous generation.

Conservation and utilization of elite germplasm

A total of 32 sires and 256 dams in CSML and 30 sires and 244 dams were used in CSML to reproduce the S-8 generation. The average selection differential increased as compared to previous generation in CSML. Selection intensity increased in both the lines in the current

Table 44. Performance of Hansli

Traits	S2	S3
Body weight (g)		
Day old	30.29 \pm 0.05 (1148)	32.34 \pm 0.04 (870)
8 wks	556.6 \pm 5.15 (1094)	587.0 \pm 8.32 (827)
20 wks	1536 \pm 16.23	1561 \pm 18.09
40 wks	3015 \pm 48.35	3029 \pm 52.34
FCR (8 wks)	4.09	4.04
Body conformation traits		
Breast Angle (°)	42.63 \pm 0.89	43.05 \pm 0.99
Shank Length (cm)	7.29 \pm 0.06	7.45 \pm 0.05
Keel Length (cm)	6.24 \pm 0.06	6.78 \pm 0.05
Mortality (%)		
0-8 wks	4.70	4.94
9-20 wks	2.10	2.08
21-40 wks	3.87	3.65
Fertility (%)	84.05	77.14
Good chicks (Nos.)	1148	870
Hatchability (%)		
TES	74.17	66.97
FES	88.31	86.83
ASM (d)	173	176
Egg weight (g)		
32 wks	40.39 \pm 0.24	41.65 \pm 0.28
40 wks	44.29 \pm 0.55	43.55 \pm 0.48
52 wks	47.09 \pm 0.83	47.22 \pm 0.81
Egg production (Nos.)		
40 wks	23.14	25.09
52 wks	33.25	33.88

Table 45. Summary of selection records of CSFL and CSML

Particulars	CSFL		CSML	
	S-7	S-8	S-7	S-8
Generation				
Sires	32	32	30	34
Dams	256	256	240	244
Sires contributed	32	32	30	34
Dams contributed	251	253	238	242
Effective number	113.53	113.6	106.57	119.25
Rate of inbreeding	0.004	0.004	0.005	0.004
Average expected selection differential (g)	215.13	214.57	127.84	142.37
Selection intensity	0.92 M 0.82 F	0.97 M 0.91 F	0.49 M 0.58 F	0.67 M 0.59 F

generation as compared to previous generation. The summary of the selection records is presented in Table 45.

Incubation records

The overall fertility in CSFL and CSML was and almost similar to previous generation. The hatchability on total and fertile egg set basis in the current generation improved marginally from last generation in both CSFL and CSML. The summary of incubation records is presented in Table 46.

Table 46. Incubation records for CSFL, CSML and control line

Gen.	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
CSFL					
S-7	2080	87.55	1635	78.61	89.79
S-8	1946	86.84	1534	78.83	90.77
CSML					
S-7	2146	88.12	1657	77.21	87.63
S-8	1957	86.92	1546	78.99	90.89

Mortality

The mortality during 0-5 weeks in CSFL and CSML line was 4.19 and 4.09 %, respectively. Mortality records are presented in Table 47.

Table 47. Mortality (%) at different ages

Gen.	Age in wks		
	0-5	6-20	21-40
CSFL			
S-7	4.82	6.21	2.09
S-8	4.19	NR	-
CSML			
S-7	4.53	5.11	3.78
S-8	4.09	4.87	-

NR is not reported

Body weight

The body weight at 5 weeks of age in CSFL and CSML lines was 1032 and 1137 g, respectively during current generation which was slightly improved. FCR up to 5 weeks of age decreased in CSFL and increased in CSML in the current generation. The juvenile traits during current and previous generations are presented in Table 48. The frequency distribution of body weight is presented in Fig. 11.

Production traits

The ASM and body weight at 20 and 40 weeks of age is presented in Table 49. The body weight is more than the recommended level at 20 weeks of age, which needs to be maintained between 2150-2200 g. ASM of current generation (S-7) in CSFL (184 d) and CSML (183 d) increased by 3 days as compared to previous generation (S-6).

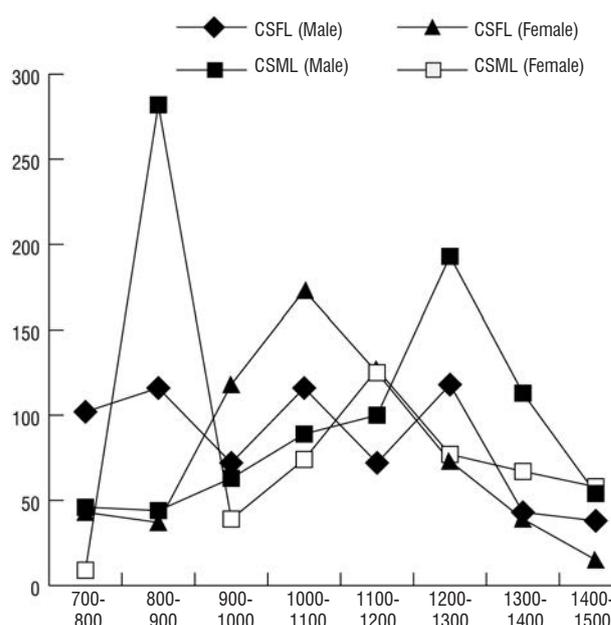


Fig. 11: Frequency distribution of BW 5 wks of CSML and CSFL (Male and Female)

Table 48. Body weight, FCR and conformation traits in CSFL, CSML and control

Gen.	BW 5 wks (g)	FCR	BA ^o	SL (mm)	KL (mm)
CSFL					
S-7	1025±6.28 (1556)	1.94	52.06±0.20 (1556)	80.55±0.32 (1556)	85.76±0.24 (1556)
S-8	1032±7.09 (1534)	1.92	52.16±0.18 (1534)	81.06±0.31 (1534)	85.49±0.23 (1534)
CSML					
S-7	1129±6.26 (1582)	1.91	52.15±0.20 (1582)	80.70±0.30 (1582)	86.31±0.26(1582)
S-8	1137±7.08 (1546)	1.93	53.05±0.22 (1546)	81.51±0.33 (1546)	86.68±0.27 (1546)

Table 49. Body weight (g) at 20 and 40 week in CSFL, CSML and Control

Gen.	ASM (d)	BW 20 wks (g)	BW 40 wks (g)
CSFL			
S-6	181	2352±16.28 (300)	2978±51.76 (300)
S-7	184	2360±17.18 (300)	2981±52.36 (300)
CSML			
S-6	180	2497±27.18 (300)	3279±27.28 (300)
S-7	183	2506±29.45 (300)	3254±29.45 (300)

Egg production and egg weight

Egg production up to 40 weeks of age in CSFL and CSML was 53.78 and 60.33 eggs. EP40 has increased in both the lines. Egg production up to 52 week increased in CSFL as well as CSML. Egg weights at 32 week and 40 week in CSFL and CSML has maintained in the current year similar to the previous year. Egg weight and egg production in CSFL and CSML lines are presented in Table 50.

Table 50. Egg weight and egg production in CSFL and CSML lines

Gen.	EW 32 wks (g)	EW 40 wks (g)	EP 40 wks (Nos.)	EP 52 wks (Nos.)
CSFL				
S-6	52.99±0.32	56.24±0.81	52.39	84.18
S-7	52.65±0.35	56.71±0.88	53.78	85.12
CSML				
S-6	53.64±0.51	55.98±0.51	58.79	90.22
S-7	53.51±0.54	56.08±0.52	60.33	91.54

The egg quality

The egg quality traits of CSFL and CSML are presented in Table 51.

Table 51. Egg quality traits at 52 weeks of CSFL and CSML lines

Egg quality traits	CSFL		CSML	
	S-6	S-7	S-6	S-7
Egg weight (g)	58.57±0.77	59.24±0.82	58.05±0.46	58.19±0.45
Shape index (%)	75.10±0.37	76.03±0.38	72.06±0.44	73.08±0.46
Shell Thickness (mm)	0.336±0.03	0.337±0.03	0.420±0.04	0.424±0.04
Albumen Index	0.077±0.006	0.079±0.005	0.082±0.005	0.086±0.004
Yolk Index	0.433±0.004	0.441±0.004	0.462±0.002	0.467±0.002
Haugh Unit	74.72±2.25	75.19±2.32	79.68±1.33	79.33±1.15

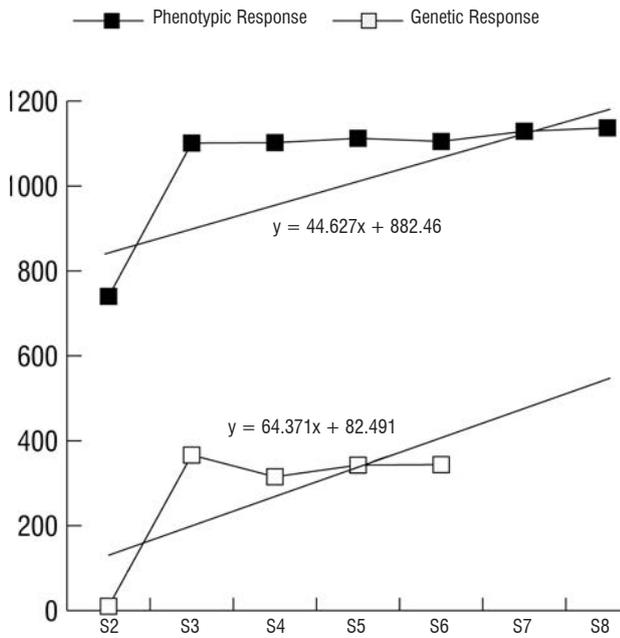


Fig. 12 Genetic and Phenotypic response to BW 5 wks in CSML at Bhubaneswar

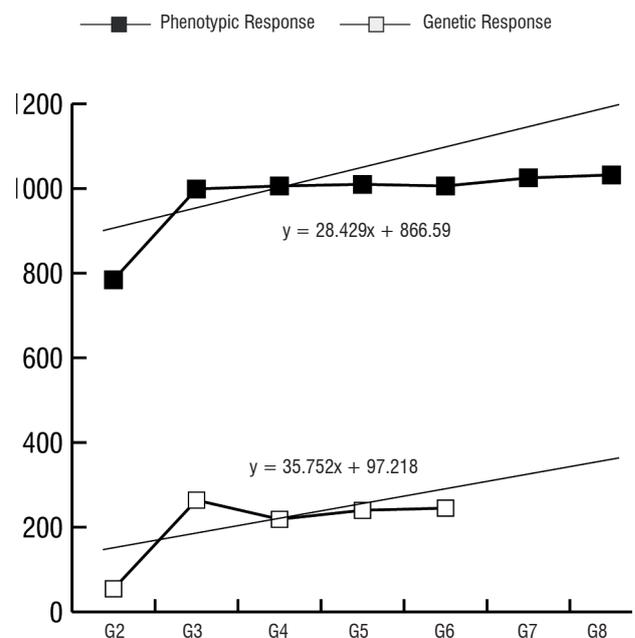


Fig. 13 Genetic and Phenotypic response to BW 5 wks in CSFL at Bhubaneswar

Response to selection

The phenotypic response of CSML and CSFL over seven generations were 44.63 and 28.63 g, respectively for 5 week body weight. (Figures 12 and 13).

Germplasm supply

This centre supplied a total of 15,212 germplasm to the farmers.

Revenue generation

During the year 2019-20, the centre generated revenue of Rs.4.54 lakhs which is 32% of expenditure on feed (Rs.14.10 lakhs).



ICAR Research Complex for NEH Regional Centre, Agartala (Tripura)

Activities 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 chickens with improved germplasm
- The centre has to work on development of germplasm for rural poultry for the region utilizing native chicken population.

Action taken

- During the present year, the centre evaluated Tripura Black, *Dahlem Red*, Coloured broiler dam line (CSFL), BN and BND crosses.
- BND cross was evaluated in E-4 generation up to 40 weeks of age.
- E-3 performance of BND cross was evaluated at institute farm as well as the farmer's field's conditions up to 72 weeks of age.

Achievements

During the period under report, the centre hatched 10402 good chicks of Tripura Black and evaluated up to 52 weeks of age. The body weight at 40 weeks was 1206, 1875, 3295 and 1998g in Tripura Black, *Dahlem Red*, coloured broiler dam line and BN cross, respectively. During E-3 evaluation of BND cross, the 72 week egg production was 162.3 and 133.45 eggs under farm and field conditions, respectively. During E-4 evaluation of BND cross, the 40 week egg production was 53.8 and 42.95 eggs under farm and field conditions, respectively.

Incubation and hatching

A total of 42924 chicks of different varieties / lines of chicken were produced. The overall fertility was 76.23% in different breeds/varieties/ lines of chicken. The fertility ranged from 74.34 to 81.13%. The fertility improved in Tripura Black, BN and BND crosses as compared to previous generations except in *Dahlem Red* and CSFL cross. The overall hatchability on fertile egg set (FES) and total egg set (TES) were 81.60 and 64.65%, respectively.

Table 52. Summary of incubation and hatching of different populations

Strains	Year	Eggs set (Nos.)	Fertile eggs (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks hatched (Nos.)
					TES	FES	
Tripura Black	2017-18	6915	-	74.95	59.49	79.37	4114
	2018-19	17514	-	75.98	62.54	82.31	10954
	2019-20	15889	12560	79.05	65.47	82.82	10402
CSFL	2017-18	10493	-	81.42	64.46	79.16	6764
	2018-19	6704	-	80.04	61.47	76.79	4121
	2019-20	5602	4241	75.71	57.78	76.33	3237
<i>Dahlem Red</i>	2017-18	3641	-	80.47	61.87	76.89	2253
	2018-19	2055	-	72.60	46.03	63.40	946
	2019-20	3223	2396	74.34	55.66	74.87	1794
BN cross	2017-18	3300	-	75.48	61.66	81.69	2035
	2018-19	3259	-	67.96	56.58	83.25	1844
	2019-20	7741	5871	75.84	64.88	85.54	5022
BND cross	2017-18	12486	-	76.31	59.77	78.31	7463
	2018-19	14870	-	77.37	61.72	79.77	9179
	2019-20	33937	27532	81.13	64.65	81.61	22469

Table 53. Mortality (%) at different ages in different populations

Strain	Year	0-6 wks	7-20 wks	21-40 wks	41-72 wks
Tripura Black	2017-18	4.30	9.32	9.10	9.00
	2018-19	1.23	9.66	2.37	2.26
	2019-20	2.90	4.37	2.29	1.75
Dahlem Red	2017-18	4.70	5.10	6.40	6.50
	2018-19	28.51	1.61	10.71	4.33
	2019-20	9.48	5.98	1.16	2.08
CSFL	2018-19	3.88	18.11	1.99	2.23
	2019-20	4.60	8.30	2.35	2.90
BN cross	2017-18	5.90	9.55	4.80	5.10
	2018-19	6.85	-	-	-
	2019-20	6.39	9.42	0.84	2.30
BND cross	2017-18	5.82	3.10	2.80	2.90
	2018-19	2.69	26.24	2.30	2.57
	2019-20	2.21	0.63	0.95	1.24

The hatchability on TES as well as on FES also improved in Tripura Black, BN and BND cross populations as compared to previous generations except in *Dahlem Red* and CSFL cross. The highest hatchability on FES was 85.54% in BN cross and the highest hatchability on TES was 66.21% in BND cross. The lowest hatchability on FES and TES was 74.87% and 55.66% in *Dahlem Red* (Table 52).

Mortality

The mortality during brooding period was lowest in BND Cross and highest in *Dahlem Red*. Mortality during growing period ranged from 0.63 to 9.42% and during laying period it ranged from 0.84 to 2.35% (Table 53).

Performance of pure lines

The performance of native, *Dahlem Red* and coloured broiler populations was evaluated up to 52 weeks of age. The body weight of hens at 40 weeks was less in Tripura Black, almost similar in *Dahlem Red* and more in Coloured broiler as compared to previous generation. The pooled body weight at 40 weeks was slightly less as compared to previous generation. ASM was less in Tripura Black and *Dahlem Red* and more in Coloured broiler as compared to the previous generation. The egg production up to 40

Table 54. Performance of different pure lines

Traits	N	Tripura Black		N	Dahlem Red		N	Coloured Broiler Dam line (CSFL)	
		2019-20	2017-18		2019-20	2017-18		2019-20	2017-18
Body weight (g)									
Day old	67	31.40 ± 0.66	31.10 ± 0.60	58	34.64 ± 0.47	37.80 ± 0.45	46	44.98 ± 0.38	45.20 ± 0.42
4 wks	63	149.9 ± 3.6	155.9 ± 3.9	52	210.4 ± 6.8	225.2 ± 8.0	45	417.7 ± 10.2	436.5 ± 10.8
8 wks	60	306.5 ± 7.9	316.4 ± 8.3	50	495.0 ± 17.4	544.2 ± 16.1	44	1102 ± 36.4	1045 ± 32.2
12 wks	58	532.6 ± 14.2	564.2 ± 16.4	47	953 ± 29.2	1012 ± 30.6	42	1722 ± 38.5	1750 ± 30.4
20 wks, F	43	1027 ± 23.2	991 ± 26.2	33	1432 ± 46.5	1464 ± 37.7	19	2451 ± 69.3	2443 ± 74.1
20 wks, Pooled sex	57	1117 ± 29.2	1106 ± 24.5	47	1601 ± 51.4	1720 ± 33.2	38	2789 ± 74.4	3240 ± 60.8
40 wks, F	42	1104 ± 17.3	1403 ± 19.5	32	1682 ± 32.4	1673 ± 44.9	19	2809 ± 80.3	2616 ± 61.7
40 wks, Pooled sex	55	1206 ± 29.1	1571 ± 96.2	45	1875 ± 53.5	2125 ± 158	38	3295 ± 100	3403 ± 119
Age at first egg in the flock (d)	43	142.7	146	33	134.1	131	19	132.0	137
ASM (d)	43	171	176	33	155.76	158	19	166.5	165
EP 40 wks (Nos.)									
HH	43	35.78	38.10	33	64.97	61.50	19	40.64	35.48
HD		36.88	43.96		66.12	63.17		40.64	37.13
Survivors'	41	37.53	46.74	32	67.00	64.71	19	40.64	37.45
EP 52 wks (Nos.)									
HH	43	64.74	70.93	33	112.8	111.4	19	62.34	63.58
HD		67.37	84.74		116.4	119.2		63.45	67.79
Survivors'	40	69.59	91.20	31	120.1	131.1	18	65.80	71.10
EW 40 wks (g)	73	42.89 ± 0.41	38.89 ± 0.57	68	53.34 ± 0.47	53.18 ± 0.61	52	57.25 ± 0.51	59.57 ± 0.67

Table 55. Performance of BN cross

Traits	N	2019-20	2017-18
Body weight (g)			
Day old	80	35.04 ± 0.43	36.85 ± 0.38
4 wks	75	211.4 ± 7.8	219.5 ± 8.1
8 wks	69	512.9 ± 19.3	550.2 ± 18.6
12 wks	61	959 ± 31.1	980.4 ± 23.3
20 wks, F	28	1291 ± 34.9	1269 ± 32.3
20 wks, Pooled sex	57	1593 ± 45.3	1590 ± 41.5
40 wks, F	27	1579 ± 41.9	1714 ± 34.5
40 wks, Pooled sex	55	1998 ± 65.2	2339 ± 121
Age at first egg in the flock (d)	28	139.7	136
ASM (d)	28	167.9	169
EP 40 wks (Nos.)			
HH	28	33.49	36.30
HD	-	34.04	38.33
Survivors'	27	34.74	39.93
EP 52 wks (Nos.)			
HH	28	60.51	66.24
HD	-	61.96	71.65
Survivors'	27	62.75	76.71
EW 40 wks (g)	56	48.27 ± 0.66	50.89 ± 1.01

and 52 weeks of age showed slight reduction in native chicken. The egg weight for *Dahlem Red* was similar to previous generation and egg weight for Tripura Black showed improvement to previous generation (Table 54).

Performance of BN cross

The performance of BN cross was evaluated up to 52 weeks of age. The body weight at 20 weeks was 1593 g almost equal to the previous generation and body weight at 40 weeks was reduced as compared to previous generation. The egg production up to 40 and 52 weeks of age showed slight reduction as compared to previous generation. The egg weight at 40 week slightly reduced as compared to previous generation (Table 55).

Performance of BND cross

In E-3 evaluation of BND cross, the 72 week egg production was 162.3 and 133.45 eggs under farm and field conditions, respectively. E4 evaluation of BND cross was completed under farm and field conditions up to 40 weeks of age. During E-4 evaluation of BND cross, the 40 week egg production was 53.8 and 42.95 eggs under farm and field conditions, respectively. The body weight at 20 weeks was 1821 ± 37.13 and 1378 ± 18.69 g in male and females of three way cross under farmer's backyards. The body weight recorded at 20 and 40 weeks of age showed slight reduction as compared to previous (E3) evaluation. The age at sexual maturity has increased by 6 and 5 days under farm and field conditions, respectively compared to previous (E3) evaluation. The egg weight for field was almost similar to previous evaluation and egg weight for farm showed slightly reduction to previous evaluation (Table 55a).

Table 55a. Performances of BND cross

Traits	BND cross (E-4)				BND cross (E-3)	
	N	Farm	N	Field	Farm	Field
Body weight (g)						
Day old	253	32.21 ± 0.31	-	-	37.57 ± 0.29	-
4 wks	172	209.6 ± 3.9	540	198.6 ± 1.96	234.5 ± 3.26	242.48 ± 4.8
8 wks	136	515.8 ± 9.1	401	435.2 ± 10.4	499.2 ± 9.44	403 ± 14.2
20 wks	132	1605 ± 27.0	239	1532 ± 18.7	1654 ± 24.8	1546 ± 24.1
40 wks* F	72	1710 ± 25.7	125	1590 ± 21.4	1814 ± 43.95	1579 ± 53.6
40 wks, Pooled sex	115	1964 ± 42.7	182	1772 ± 30.6	2056 ± 45.8	1785 ± 56.2
Age at first egg (d)	75	132.6	-	-	-	1714 ± 34.5
ASM (d)	75	118	145	133	143	2339 ± 121
EW 40 wks (g)	107	162	118	173	156	168
ASM (d)	28	50.91 ± 0.33	102	47.40 ± 0.39	52.50	47.30
Egg production (Nos.)						
40 wks	72	53.77	113	42.95	52.50	43.90
52 wks	-	-	-	-	94.80	82.75
72 wks	-	-	-	-	162.3	133.4

* Females

Training programme

A total of eleven training programmes on backyard poultry farming for rural farmers were organized at different places of Tripura to improve the skills for augmenting poultry production. A total of 500 rural 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.

Germplasm supply

A total of 40,306 germplasm was supplied to the farmers during the reporting period

Revenue generation

The centre realized overall receipt of Rs. 11.57 lakhs which was 53.86% of the expenditure on feed cost (Rs. 21.48 lakhs).



Nanaji Deshmukh Veterinary Science University, Jabalpur (Madhya Pradesh)

Activities assigned

- Evaluation and improvement of the *Kadakhnath* chicken germplasm and to maintain as pure line.
- Evaluation of improved chicken germplasm in the local climatic condition for development of cross.
- Evaluation of *Narmadanidhi* in different agro climatic conditions.

Action taken

- The centre maintained *Kadakhnath*, Jabalpur colour, CSFL, M-1 and M-2 populations.
- During the current year, the centre evaluated G-10 generation of *Kadakhnath* (Kd) and Jabalpur colour populations up to 52 weeks of age.
- Performance of CSFL was evaluated.
- The *Narmadanidhi* was evaluated in the field up to 72 weeks of age.
- M1 and M2 were conserved and evaluated.

Achievements

The G-10 generation of *Kadakhnath* 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 population (G10) was reproduced utilizing 60 sires and 360 dams and *Kadakhnath* population (G10) was reproduced utilizing 50 sires and 300 dams (Table 56). The average effective selection differential was 14.35 and 9.15 in JBC and *Kadakhnath* populations and corresponding selection intensity was 0.44 and 0.27 respectively for body weight at 6 weeks of age.

Table 56. Summary of selection record of Jabalpur colour and *Kadakhnath* (G10)

Particulars	Jabalpur colour	<i>Kadakhnath</i>
Sires	60	50
Dams	360	300
Sires contributed	60	45
Dams contributed	360	270
Effective number	205.7	154.3
Rate of inbreeding	0.00243	0.00324
Expected sel. Differential for male (g)	14.2	9.0
Expected sel. differential for female (g)	15.2	10.2
Average sel. differential expected (g)	14.7	9.6
Effective sel. differential for male (g)	13.9	8.6
Effective sel. differential for female (g)	14.8	9.7
Average sel. differential Effective (g)	14.35	9.15
Selection intensity	0.44	0.27

Incubation records

The fertility maintained above 80% in all the populations except CSFL. The hatchability on total eggs set improved in *Kadakhnath* and CSFL, whereas, it decreased in Jabalpur colour (Table 57).

Table 57. Incubation information of different populations

Strain	Gen.	Fertility (%)	Chicks hatched (No.)	Hatchability (%)	
				TES	FES
Jabalpur colour line	G-9	89.54	3742	66.90	74.87
	G-10	83.66	1855	55.19	65.97
<i>Kadakhnath</i>	G-9	88.21	2429	64.20	72.53
	G-10	87.54	1995	68.92	78.73
CSFL	2018-19	80.45	157	51.14	63.56
	2019-20	73.16	112	65.79	89.93
<i>Kadakhnath</i> Cross	2019-20	87.53	767	64.21	73.36

Table 58. Mortality (%) at different ages

Strain	Gen.	0-8 wks	9-20 wks	21-40 wks
Jabalpur colour line	G-10	5.27	3.38	4.26
<i>Kadaknath</i>	G-10	6.68	4.25	4.11
Crosses	2019-20	5.08	3.91	3.18
CSFL	2019-20	7.14	5.77	6.09

Mortality

In G10 generation, during brooding period (0-8 wks) the mortality ranged between 5.08 and 7.14% in all the populations (Table 58). The mortality ranged between 3.38- 5.77% during the growing period.

Performance of pure lines and different crosses under different management systems

During G-10 generation, the 6 week body weight was 430.6 and 715.3 g in *Kadaknath* and Jabalpur colour population, respectively, which was comparatively decreased in JBC (803.7g) and increased in *Kadaknath* (342.3g) compared to the previous generation (Table 59). The egg weight at 40 weeks of age was 57.9 g in Jabalpur colour and 47.1 g in *Kadaknath*, respectively. The hen housed egg production up to 40 weeks of age was 98.6 eggs in JBC population and 62.3 eggs in *Kadaknath* and performance significantly improved compared to previous generation in both the lines. In CSFL, the 40 week egg weight and production were 60.3 g and 61.0 eggs, respectively.

Narmadanidhi, dual type chicken having 25% Kd: 75% JBC colour inheritance was evaluated under farm and field conditions. Birds matured at 169 days and produced 71 and 107 eggs up to 40 and 52 weeks of age in farm conditions. *Narmadanidhi* chicks were supplied to Poultry farmers of different villages of district Jabalpur, Seoni, Mandla, Dindori, Katni, Narsinghpur, Khajuraho and surrounding area of Jabalpur. In field, males attained body weight of 770 and 1580 g at 8 and 20 weeks of age respectively whereas female attained the body weight of 635 and 1330 g. *Narmadanidhi* produced 47.3, 90.2 and 179 eggs up to 40, 52 and 72 weeks, respectively in field conditions (Table 60). The egg production increased 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 was supplied to the farmers.

Table 59. Performance of growth and production traits in pure lines

Traits	Jabalpur Colour (G-10)		Kadaknath (G-10)		CSML
	N	Farm	N	Farm	Farm
Body weight (g)					
6 wks	1730	715.3 ± 9.1	1810	430.6 ± 5.8	1031 ± 9.5*
20 wks	727	1711 ± 21.4	750	1145 ± 18.6	2180 ± 22.1
40 wks	680	2130 ± 17.9	730	1570 ± 24.2	2411 ± 19.6
ASM (d)	-	151 ± 1.6	-	166 ± 1.18	179 ± 1.3
Egg weight (g)					
28 wks	-	49.2 ± 0.23	-	40.1 ± 0.05	-
40 wks	-	57.9 ± 0.18	-	47.1 ± 0.03	60.3 ± 0.50
EP 40 wks (Nos.)	680	-	730	-	-
HH	-	95.5	-	58.2	-
HD	-	98.6 ± 1.23	-	62.3 ± 1.76	61.0 ± 1.4
Survivor	-	96.2	-	60.1	-
EP 52 wks (Nos.)	615	-	216	-	-
HH	-	156.7	-	90.5	-
HD	-	161.4 ± 1.6	-	93.7 ± 1.8	-
Survivor	-	158.1	-	92.1	-

* BW 5 Wks

Table 60. Performance of growth and production traits in *Narmadanidhi*

Particular		Farm	Field
Body weight 8 wks (g)	(M)	1080±16.2	770.6±14.5
	(F)	712.5±11.8	635.1±23.2
Body weight 20 wks (g)	(M)	1721±19.06	1581±17.8
	(F)	1661±22.7	1330±24.1
Body weight 40 wks (g)	(M)	2770±15.8	2540±22.5
	(F)	1890±18.3	1711±16.3
ASM (d)	-	169	-
Egg weight (g) 40 wks	-	48.8	47 -48
Egg production (Nos.)			
	40 wks	-	71±3.2
	52 wks	-	107±2.8
	72 wks	-	179±5.8

Germplasm supply

A total of 58,300 germplasm was supplied to 478 beneficiaries during the period 2019-20.

Revenue generation

The centre realized overall receipt of Rs. 18.70 lakhs



Assam Agricultural University, Guwahati (Assam)

Activities assigned

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

Action taken

- The performance of native chicken was evaluated under intensive system.
- The performance of PB-2 x Native crossbred chicken was studied up to 52 weeks
- The performance of 1300 nos. of *Dahlem Red* birds procured from DPR, Hyderabad was evaluated.
- The performance of *Kamrupa* was evaluated in the farm and field condition up to 52 weeks.
- Performance of *Daothigir* birds procured from Kokrajhar district was evaluated.

Achievements

Incubation records

The summary of incubation records of native chicken and its crosses is presented in Table 61. The average fertility of all three populations was 89.53 %. The hatchability on total eggs set ranged from 53.94 to 83.32%. The fertility is either improved or maintained as compared to those of previous generation in all three populations. However, fertility in BN cross continues to be lesser and reasons for low fertility in this cross must be ascertained and necessary steps need to be taken up to address the low fertility. Hatchability in all three populations was maintained similar to those observed in previous generation of respective population.

Table 61. Summary of incubation and hatching records of native chicken and its crosses

Strain	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Local native	2018-19	637	78.33	63.58	81.16	405
	2019-20	718	80.08	65.74	82.08	472
BN cross	2018-19	468	65.17	52.78	80.98	247
	2019-20	519	66.67	53.94	80.92	280
BND cross	2018-19	27189	90.11	83.31	92.45	22652
	2019-20	30226	90.15	83.32	92.42	25183

Mortality

The incidence of mortality during various stages of growth and production of six different genetic groups are presented Table 62. The mortality during brooding and growing period was below 4.04 % in all genetic groups. The mortality during laying period was below 3.15% in all populations.

Table 62. Mortality in different populations at different ages

Strain	Year	Age			
		0-5 wks	6-20 wks	21-40 wks	41-52 wks
Native	2018-19	2.12	2.48	1.27	0.96
	2019-20	2.32	2.16	1.05	0.97
PB-2	2018-19	2.82	2.90	1.19	1.81
	2019-20	2.67	2.05	1.39	1.41
<i>Dahlem Red</i>	2018-19	3.93	2.50	1.28	1.65
	2019-20	3.92	2.80	1.48	0.92
BN cross	2018-19	2.45	1.53	0.70	1.14
	2019-20	1.94	1.32	0.67	0.51
BND cross	2018-19	3.64	4.04	2.11	1.12
	2019-20	3.47	2.58	1.18	0.63
<i>Daothigir</i>	2019-20	-	4.04	3.15	-

Performance evaluation of native chicken

The juvenile and production performance of native, PB-2 and *Dahlem Red* breed over two generations are presented in Table 63, 64 and 65, respectively. The five weeks body weight was 140.6 g in native, 1210g in PB-2 and 390.1g in *Dahlem Red*. The ASM was lowest in *Dahlem Red* (160.4 days) and highest in native (173.9 days). Native chickens matured early by 1.30 days and *Dahlem Red* pullets by 0.90 days compared to previous generation. In native chicken population, the egg weight and egg production up to 52 weeks was 40.60 g and 68.10 eggs, respectively. In *Dahlem Red* egg production improved by 0.9 eggs.

Table 63. Juvenile and production traits in native chickens in last two generations

Traits	2019-20		2018-19	
	N	Mean ± SE	N	Mean ± SE
Body wt (g) at				
Day old	550	34.20 ± 2.60	600	33.9 ± 2.70
5 wks	525	140.6 ± 5.80	570	132.5 ± 6.9
20 wks	500	1181 ± 105.3	540	1131 ± 95.5
40 wks	470	1691 ± 125.3	490	1610 ± 120.5
FCR up to 5 wks	525	3.15	570	3.25
Conformation traits at 5 wks of age				
Shank length (mm)	525	48.90 ± 2.9	570	48.1 ± 3.2
Keel length (mm)	525	51.80 ± 2.9	570	51.1 ± 3.2
Breast Angle (o)	525	57.10 ± 6.2	570	57.2 ± 5.2
ASM (days)	270	173.9 ± 5.9	300	175.2 ± 6.20
Egg weight (g) at				
32 wks	260	36.60 ± 2.6	270	36.10 ± 2.6
40 wks	250	37.60 ± 4.8	250	37.20 ± 4.6
52 wks	240	40.60 ± 4.3	230	40.30 ± 3.9
EP 40 wks (Nos.)				
Hen housed	270	39.10	300	38.60
Hen day	-	40.90	-	40.20
Survivors'	240	41.70	260	40.90
EP 52 wks (Nos.)				
Hen housed	270	68.10	300	67.50
Hen day	-	69.90	-	69.20
Survivors'	210	73.20	230	72.30

Table 64. Juvenile and production traits in *Dahlem Red* breed in last two generations

Traits	2019-20		2018-19	
	N	Mean ± SE	N	Mean ± SE
Body wt (g) at				
Day old	600	37.10 ± 2.80	500	36.90 ± 2.60
5 wks	570	390.1 ± 70.30	480	360.2 ± 65.5
20 wks	530	1290 ± 120.3	450	1210 ± 110.2
40 wks	500	1850 ± 430.5	400	1741 ± 320.6
FCR up to 5 wks	570	2.60	480	2.65
Conformation traits at 5 wks of age				
Shank length (mm)	570	61.30 ± 2.90	480	61.2 ± 3.1
Keel length (mm)	570	53.90 ± 2.80	480	53.7 ± 2.6
Breast Angle (o)	570	63.80 ± 2.50	480	63.9 ± 2.4
ASM (days)	400	160.4 ± 7.30	340	161.3 ± 6.90
Egg weight (g) at				
32 wks	370	49.60 ± 5.20	310	49.30 ± 4.60
40 wks	350	59.40 ± 6.90	280	59.20 ± 7.20
52 wks	320	61.50 ± 7.20	250	61.10 ± 6.50
EP 40 wks (Nos.)				
Hen housed	400	63.60	340	63.10
Hen day	-	65.50	-	64.80
Survivor	350	66.60	280	65.70
EP 52 wks (Nos.)				
Hen housed	400	120.20	340	119.30
Hen day	-	121.70	-	120.60
Survivor	300	123.10	230	121.80

Table 65. Juvenile growth and conformation traits in PB-2 line in last two generations

Traits	2019-20		2018-19	
	N	Mean ± SE	N	Mean ± SE
Body wt (g) at				
Day old	150	48.20 ± 5.20	130	46.1 ± 4.30
5 wks	135	1210 ± 80.7	120	1165 ± 90.6
20 wks	110	2491 ± 70.4	95	2431 ± 185.3
40 wks	80	3421 ± 30.5	60	3361 ± 415.6
FCR up to 5 wks	135	2.70	120	2.73
Conformation traits at 5 wks of age				
Shank length (mm)	135	76.60 ± 5.90	120	76.3 ± 6.2
Keel length (mm)	135	88.90 ± 8.80	120	87.8 ± 8.6
Breast Angle (o)	135	72.60 ± 5.20	120	72.3 ± 4.3

Table 66. Juvenile and production performance of Daothgir breed

Traits	N	Mean ± SE
Body weight (g) at		
20 wks	95	1021 ± 104.9
40 wks	92	1681 ± 135.6
ASM (days)	50	210.8 ± 5.20
Egg weight (g) at		
32 wks	50	31.50 ± 2.80
40 wks	50	34.60 ± 3.80
EP 40 wks (Nos)		
Hen housed	50	17.10
Hen day	-	17.90
Survivor	40	19.70

Daothgir breed : The juvenile and production traits in Daothgir are presented in Table 66. The ASM is higher and 40 weeks egg production and egg weight at 40 weeks of age were lesser in this breed.

Performance of crosses

BN Cross

The five week body weight was 275.6 g and FCR was 3.14 in BN cross. The age at sexual maturity was 167.9 days and remained almost similar as compared to previous generation. The hen housed egg production up to 52 weeks was 72.6 eggs. Almost all the parameters are similar as compared to previous generation (Table 67).

Kamrupa (BND cross)

The *Kamrupa* variety was evaluated up to 52 weeks in farm and field conditions during the current year. The 5 weeks body weight was 250.5 and 210.6 g in the farm and field, respectively. The age at sexual maturity was 150.6 days in the farm and 170.4 days in the field. The egg weight at 40 weeks of age was 56.10 and 41.90 g, respectively in farm and field. The hen housed egg production up to 40 weeks and 52 weeks of age was 49.20 and 90.40 eggs in the farm and corresponding values in the field were 43.60 and 73.70 eggs, respectively. The performance of cross was slightly improved over last two generations (Table 68).

Table 67. Juvenile and production performance of two way (BN) cross

Traits	BN cross at Farm (2019-20)		BN cross at Farm (2018-19)	
	N	Mean ± SE	N	Mean ± SE
Body weight (g) at				
Day old	400	35.90 ± 6.90	410	35.60 ± 7.10
5 wks	380	310.5 ± 27.30	390	275.6 ± 26.3
20 wks	350	1790 ± 170.5	360	1731 ± 160.4
40 wks	320	2621 ± 410.2	340	2571 ± 360.2
FCR up to 5 wks	380	3.10	390	3.14
Conformation traits at 5 wks				
Shank length (mm)	380	51.9 ± 4.10	390	51.6 ± 3.70
Keel length (mm)	380	52.9 ± 7.20	390	52.7 ± 8.20
Breast Angle (o)	380	67.1 ± 8.60	390	66.9 ± 8.30
ASM (days)	200	167.2 ± 6.10	200	167.9 ± 5.90
Egg weight (g) at				
32 wks	170	46.7 ± 3.10	180	46.6 ± 2.70
40 wks	150	49.2 ± 7.20	160	48.9 ± 6.30
52 wks	140	58.9 ± 6.20	140	58.4 ± 5.10
EP 40 wks (Nos.)				
Hen housed	200	39.80	200	39.20
Hen day	-	41.10	-	40.30
Survivor	150	43.40	160	42.60
EP 52 wks (Nos.)				
Hen housed	200	73.30	200	72.60
Hen day	-	74.30	-	73.40
Survivor	140	76.30	150	75.20

Table 68. Juvenile and production performance of *Kamrupa* (BND cross)

Traits	2019-20				2018-19				
	Field		Farm		Field		Farm		
	N	Mean \pm SE	N	Mean \pm SE	N	Mean \pm SE	N	Mean \pm SE	
Body wt. (g) at									
day old	350	37.60 \pm 2.9	500	37.60 \pm 2.9	370	37.10 \pm 2.70	550	37.10 \pm 2.70	
5 wks	340	220.5 \pm 8.2	480	280.6 \pm 46.9	350	210.6 \pm 7.10	520	250.5 \pm 45.6	
20 wks	320	1030 \pm 110.3	450	1310 \pm 170.4	320	980 \pm 95.2	500	1210 \pm 160.5	
40 wks	290	1711 \pm 410.5	430	2270 \pm 510.6	280	1621 \pm 310.6	480	2140 \pm 430.6	
FCR up to 5 wks	340	-	480	2.70	350	-	520	2.71	
Conformation traits at 5 week of age									
Shank length (mm)	340	49.90 \pm 4.30	480	49.10 \pm 4.10	350	49.20 \pm 3.60	520	48.90 \pm 3.20	
Keel length (mm)	340	53.90 \pm 8.20	480	50.60 \pm 8.10	350	53.60 \pm 7.10	520	50.10 \pm 7.20	
Breast Angle (o)	340	51.70 \pm 7.20	480	67.90 \pm 9.30	350	51.60 \pm 6.30	520	67.20 \pm 8.40	
ASM (days)	150	170.1 \pm 7.10	250	150.2 \pm 5.10	160	170.4 \pm 6.20	270	150.6 \pm 4.90	
Egg wt. (g) at									
32 wks	210	40.80 \pm 2.60	250	50.90 \pm 5.10	230	40.60 \pm 2.50	270	50.70 \pm 4.80	
40 wks	190	42.20 \pm 6.90	230	56.40 \pm 4.30	200	41.90 \pm 6.20	250	56.10 \pm 3.20	
52 wks	170	44.10 \pm 6.90	220	58.50 \pm 6.10	180	43.80 \pm 7.10	230	58.20 \pm 5.40	
EP 40 wks (Nos.)									
Hen housed	150	43.90	250	49.70	160	43.60	270	49.20	
Hen day	-	45.20	-	51.20	-	44.80	-	50.60	
Survivor	120	46.90	230	53.60	130	46.20	230	52.80	
EP 52 wks (Nos.)									
Hen housed	150	74.20	250	90.80	160	73.70	270	90.40	
Hen day	-	75.70	-	93.30	-	75.20	-	92.60	
Survivor	120	77.80	200	94.50	120	76.90	210	93.80	

Germplasm supply

The centre supplied 44,906 (20,747 hatching eggs and 24,159 chicks/growers of *Kamrupa*) germplasm to farmers.

Revenue generation

The centre realized receipt of Rs. 8.15 lakhs during the financial year which was 52.75% of the expenditure on feed cost (Rs.15.44 lakhs).



Birsa Agricultural University, Ranchi (Jharkhand)

Activities assigned

- Evaluation and improvement of the local native chicken germplasm and to be maintained it as pure line.
- Evaluation of improved chicken germplasm in the local climate condition.
- Development of new varieties suitable for rural poultry in the region utilizing local germplasm.

Action taken

- The centre evaluated G-8 generation of native population up to 20 weeks of age and G-7 generation up to 64 weeks of age.
- The *Dahlem Red* (G-7 generation) was evaluated up to 52 weeks of age.
- The *Jharsim* (E-7) was evaluated up to 40 weeks of age and E8 up to 4 weeks of age.
- *Jharsim* birds were distributed among the farmers, NGOs/KVKs and other agencies.

Achievements

Incubation records

The fertility was maintained in native chicken and DBN cross (Table 69). The hatchability on fertile and total egg set was lower in native chicken and it reduced further as compared to previous generation. However, hatchability improved in DBN cross.

Table 69. Summary of incubation and hatching performance

Strains	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Native	2018-19	380	86.42	68.42	78.78	260
	2019-20	6352	86.38	65.38	75.68	4153
<i>Jharsim</i> (DBN)	2018-19	17120	94.22	79.20	84.05	13560
	2019-20	45630	96.64	84.92	87.86	38750

Mortality

Mortality during brooding period was reduced compared to previous year (Table 70). Mortality during growing stage ranged from 3.25 to 6.42% in different lines. During laying period mortality ranged from 4.16 to 6.35%.

Table 70. Mortality (%) at different weeks

Breeds/strains	Year	0-6 wks	7-18 wks	19-40 wks
Native	2018-19	4.17	3.25	4.58
	2019-20	5.12	3.15	5.10
<i>Dahlem Red</i>	2018-19	5.37	5.33	4.69
	2019-20	5.20	4.52	3.42
PB2	2018-19	4.68	5.21	6.35
	2019-20	4.21	4.48	5.61
PB2 x Desi	2018-19	-	-	4.16
	2019-20	4.20	3.45	3.88
<i>Jharsim</i>	2018-19	6.85	6.42	4.65
	2019-20	5.97	5.74	4.42

Performance evaluation of germplasm

In native population, production traits were evaluated from 64 weeks of age during G-7 generation and up to 40 weeks in G-8 generation (Table 71). Egg production up to 40, 52 and 64 weeks of age increased slightly as compared to those of previous generation.

Table 71. Growth and production performance of native chicken germplasm

Traits	N	Native (G-8)	N	Native (G-7)	Native (G-6)
Body weight (g)					
day old	150	28.46 ± 0.15	150	28.14 ± 0.15	32.08 ± 0.24
4 wks	149	163.98 ± 1.78	150	162.5 ± 1.55	175.8 ± 1.77
8 wks	148	360.31 ± 3.70	146	360.6 ± 2.11	490 ± 3.48
12 wks	143	757.90 ± 6.24	141	760.9 ± 2.60	753 ± 3.57
16 wks	140	972.44 ± 6.65	140	989.2 ± 6.28	1138 ± 5.36
20 wks M	34	1476 ± 15.93	31	1385 ± 9.22	1553 ± 10.19
F	92	1181 ± 10.63	104	1169 ± 2.85	1368 ± 11.73
ASM (Age at 50% production) (d)				182	178
EW 40 wks (g)	-	-	100	40.86 ± 0.24	-
EP 40 wks (Nos.)			100	32.33	-
HD	-	-	-	30.71	30.83
HH	-	-	-	-	28.17
Survivors'	-	-	-	-	-
EP 52 wks (Nos.)			95	57.59	-
HD	-	-	-	54.71	56.81
HH	-	-	-	-	52.89
Survivors'	-	-	-	-	-
EP 64 wks (Nos.)			92	74.36	72.65
HD	-	-	-	70.65	65.13
HH	-	-	-	-	-
Survivors'	-	-	-	-	-
EP 72 wks (Nos.)			90	-	84.11
HD	-	-	-	-	73.96
HH	-	-	-	-	-
Survivors'	-	-	-	-	-

In *Dahlem Red* the 40 weeks egg production decreased while 52 weeks egg production increased marginally. The egg weight at 40 weeks of age decreased by 2.58 g as compared to the previous generation. The age at first egg in the flock increased by 15 days in the present generation (Table 72).

Table 72. Growth and production performance of *Dahlem Red* breed and PB-2 line

Traits	N	<i>Dahlem Red</i>		PB2	
		G-7	G-6	2019 - 20	2018 - 19
Body weight (g)					
Day old	200	33.95 ± 0.24	34.98 ± 1.52	34.52 ± 0.38	33.08 ± 0.24
4 wks	198	190.9 ± 1.60	175.6 ± 1.02	509.3 ± 1.13	186.1 ± 1.40
8 wks	196	438.1 ± 4.1	429.1 ± 2.9	1189 ± 1.6	508.5 ± 3.7
12 wks	194	838 ± 4.6	816 ± 3.7	1867 ± 2.9	1006 ± 5.5
16 wks	192	1218 ± 6.5	1218 ± 3.9	2422 ± 22.3	1588 ± 7.3
20 wks M	29	1757 ± 13.9	1717 ± 9.1	3005 ± 27.7	2206 ± 15.99
F	161	1466 ± 7.28	1508 ± 3.67	2674 ± 22.64	1801.02 ± 8.28
Age at first egg in the flock (d)					
		170	155	-	-
EW 40 wks (g)	160	47.38 ± 0.24	49.96 ± 0.30	-	-
EP 40 wks (Nos.)					
HD	160	42.26	45.38	-	-
HH	-	41.14	44.62	-	-
Survivors'	-	-	-	-	-
EP 52 wks (Nos.)					
HD	155	103.68	102.07	-	-
HH	-	100.23	99.69	-	-
Survivors'	-	-	-	-	-
EP 64 wks (Nos.)					
HD	151	-	173.09	-	-
HH	-	-	168.48	-	-
Survivors'	-	-	-	-	-

The performance of three way crosses (*Jharsim*) was evaluated up to 20 weeks of age in E-8 and 64 weeks of age in E-7 (Table 73). The hen housed and hen day egg production up to 40 and 52 weeks of age in E-7 decreased as compared to those of E-6. However, the egg production up to 64 weeks of age in E-7 increased as compared to those of E-6. The body weight at 12, 16 and 20 weeks of age showed improvement in E-8 as compared to E-7 generation.

Table 73. Performance of three way cross *Jharsim* (DBN) in the farm

Traits	n	E-8	n	E-7	E-6
Body wt. (g) day old	200	31.9 ± 0.17	200	-	29.7 ± 0.19
4 wks	200	184.4 ± 1.09	200	-	183.4 ± 1.11
8 wks	196	467.2 ± 4.4	199	-	535.2 ± 4.5
12 wks	194	968.8 ± 5.0	195	896.9 ± 4.2	839.2 ± 5.0
16 wks	193	1386 ± 9.8	195	1294 ± 5.0	1149 ± 5.3
20 wks M	20	1830 ± 4.8	20	1791 ± 15.9	1477 ± 8.0
F	174	1670 ± 4.8	174	1554 ± 4.8	1314 ± 6.3
Age at first egg in the flock? (d)	-	-	-	159	171
EP 40 wks (Nos.)	-	-	-	-	-
HD	-	-	175	36.57	41.17
HH	-	-	-	35.71	-
Survivors'	-	-	-	-	39.29
EP 52 wks (Nos.)	-	-	165	-	-
HD	-	-	-	79.73	96.98
HH	-	-	-	77.85	89.52
Survivors'	-	-	-	-	-
EP 64 wks (Nos.)	-	-	161	-	142.4
HD	-	-	-	148.3	131.4
HH	-	-	-	143.9	-
Survivors'	-	-	-	-	-

Germplasm supply

Centre supplied 35,185 Nos. (8205 hatching eggs and 26980 chicks) germplasm to the farmers. The centre should improve the germplasm supply.

Revenue generation

The centre realized a receipt of Rs. 6.50 lakhs during the financial year which was 76.45% of the expenditure on feed cost (Rs. 8.50 lakh).



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

Activities 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

- *Mewari* breed was evaluated up to 52 weeks of age in G-9 generation.
- *Pratapdhan* was evaluated for production traits up to 72 weeks of age during E8 generation.

- RIR and CSFL populations were regenerated and being maintained at the centre
- Germplasm of *Pratapdhan*, a dual purpose variety was supplied to the farmers.

Achievements

Incubation records

The centre regenerated G-10 generation of *Mewari* chicken as well as RIR, CSFL, BN and BNR populations. The fertility improved in all the populations except CSFL as compared to previous generation. However, the hatchability on fertile eggs set decreased in all the populations (except CSFL) in the present generation/year as compared to previous generation/year (Table 74).

Table 74. Summary of incubation and hatching results of different populations

Strain / breed/ cross	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks (Nos.)
				TES	FES	
<i>Mewari</i>	2018-19 (G-9)	4537	78.06	66.21	84.79	2992
	2019-20 (G-10)	4203	80.16	65.10	81.26	2726
RIR	2018-19	6500	84.49	73.78	87.31	4827
	2019-20 (G9)	6355	86.83	73.44	84.41	4560
CSFL	2018-19	400	87.00	65.50	75.29	262
	2019-20	1124	86.08	66.48	77.14	763
BN cross	2018-19	2098	78.57	66.56	84.74	1391
	2019-20	2359	84.07	65.22	76.77	1473
<i>Pratapdhan</i>	2018-19	82843	81.21	70.39	86.83	58777
	2019-20	31948	86.03	68.99	79.92	22537

Table 75. 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
<i>Mewari</i>	G8	5.42	6.90	7.33	4.17
	G9	4.86	7.83	6.91	3.58
RIR	G8	6.68	8.79	7.38	5.96
	G9	5.79	8.57	6.27	5.22
CSFL	2018-19	6.43	7.94	7.32	4.55
	2019-20	5.74	8.11	6.18	5.18
BN cross	2018-19	5.02	7.61	6.86	6.20
	2019-20	5.39	9.38	6.12	7.66
<i>Pratapdhan</i> (BNR cross)	2018-19	3.25	3.62	7.35	4.48
	2019-20	4.75	5.25	9.14	3.96

Mortality

The incidence of mortality in various populations is presented in Table 75. The mortality was on lower side in purebred populations during juvenile period compared to previous year. However, during growing period the mortality increased in all the populations (except RIR). The mortality during 21-40 weeks of age reduced compared to previous year but it was beyond the permissible mortality of 1% per month.

Performance evaluation

In *Mewari*, the juvenile body weights at 8 weeks slightly decreased and at 16 weeks increased during G-9 generation. The body weight of females at 20 and 40 weeks of age increased as compared to G-8 generation (Table 76). The age at sexual maturity has increased by 2.1 days as compared to previous (G-8) generation. The hen housed and hen day egg production up to 40 and 52 weeks of age decreased while survivors' egg production up to same age increased as compared to previous generation (Table 76).

Evaluation of Pratapdhan

Pratapdhan was evaluated up to 72 weeks in E-8 and up to 20 weeks of age in E-9 generation (Table 77). Hen housed, hen day and survivor's egg production up to 40 weeks of age decreased as compared to previous evaluation.

Table 76. Growth and production performance of Mewari in different generations

Traits	<i>Mewari</i> (G-9)		<i>Mewari</i> (G-8)	
	N	Mean±SE	N	Mean±SE
Body weight, pooled sex (g)				
day old	2818	32.13±0.12	2406	31.83±0.12
8 wks	1569	634.1± 2.4	1229	640.9±3.81
16 wks	1344	974.9± 6.6	664	948.9±6.34
20 wks*	660	1340± 8.70	440	1335± 8.25
40 wks*	317	1746±10.53	279	1475±13.78
ASM (d)	161	165.8 ±0.49	181	163.7 ±0.47
Egg weight (g)				
28 wks	716	41.97 ± 0.20	388	42.60±0.20
40 wks	358	46.16 ± 0.17	346	45.71±0.21
EP 40 wks (Nos.)				
HH	798	35.70	-	37.31
HD	-	40.70	-	41.42
Survivors'	596	47.81	-	45.59
EP 52 wks (Nos.)				
HH	798	53.40	-	58.82
HD	-	68.95	-	69.23
Survivors'	497	85.74	-	78.48
EP 72 wks (Nos.)				
HH	-	-	435	75.96
HD	-	-	-	101.35
Survivors'	-	-	148	166.9

*Values for females only from 20 wks onwards

Table 77. Performance of growth and production traits in *Pratapdhan* (BNR cross)

Traits	N	E9	N	E8	E7	E6
Body weight (g)						
day old	400	39.18 ± 0.2	400	38.77 ± 0.1	39.02 ± 0.1	38.23 ± 0.2
2 wks	390	142.8 ± 1.2	383	140.0 ± 0.9	147.69 ± 1.10	126.6 ± 0.6
4 wks	381	367.8 ± 2.8	348	355.0 ± 4.1	378.11 ± 3.5	295.1 ± 2.2
8 wks	370	866.8 ± 7.39	321	870.1 ± 7.6	963 ± 11.9	646.7 ± 8.1
20 wks*	293	2155 ± 24.4	178	1961 ± 12.5	1927 ± 15.7	1911 ± 27.6
AFE (d)	-	-	-	132	134	138
ASM (d)	-	-	151	155.9 ± 0.60	157.6 ± 0.78	157.6 ± 0.78
Egg weight (g)						
28 wks	-	-	352	46.77 ± 0.30	47.27 ± 0.27	47.74 ± 0.22
40 wks	-	-	229	52.67 ± 0.24	52.57 ± 0.21	53.13 ± 0.31
EP 40 wks (Nos.)						
HH	-	-	149	41.19	52.35	49.91
HD	-	-	-	58.83	62.26	65.17
Survivors'	-	-	139	53.04	77.84	72.84
EP 52 wks (Nos.)						
HH	-	-	149	71.93	72.34	74.6
HD	-	-	-	96.54	100.42	103.1
Survivors'	-	-	112	95.68	152.72	117.3
EP 72 wks (Nos.)						
HH	-	-	149	97.63	100.28	100.2
HD	-	-	-	160.0	166.10	167.5
Survivors'	-	-	104	139.9	-	-

*Values for females only from 20 wks onwards

Similarly, hen housed and hen day egg production up to 52 and 72 weeks of age decreased as compared to previous evaluation.

Germplasm supply

A total of 44772 germplasm (43998 live birds and 774 hatching eggs) was supplied during the current year.

Revenue generation

The centre realized a receipt of Rs. 9.66 lakhs during the current financial year, which was 75.75 % of the expenditure on feed cost (Rs 12.76 lakhs).



CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur (Himachal Pradesh)

Activities assigned

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

Action taken

- In native germplasm, G-6 generation was evaluated up to 72 weeks and G-7 generation was evaluated up to 38 weeks of age.
- The *Dahlem Red* (G-7) population was evaluated up to 38 weeks of age
- The *Dahlem Red* X Native (DN) cross birds were produced and evaluated up to 52 weeks of age.
- The chicks of *Himsamridhi* (DND cross) have been produced and evaluated at farm and field level up to 30 weeks of age for growth and production parameters.

Achievements

Native germplasm

A total of 680 good chicks (S-7) were housed for recording of juvenile growth traits. Egg production was recorded up to 40 weeks of age, Heritability estimate in native population (G-7) from sire component for body weight at 8, 12 and 20 weeks of age were 0.12 ± 0.04 , 0.22 ± 0.08 and 0.16 ± 0.08 respectively.

The G-7 generation of *Dahlem Red* population was evaluated up to 40 weeks of age and G-6 generation from previous year was evaluated from 52 to 72 weeks of age.

Incubation records

The summary of incubation records for various pure lines and crosses is presented in Table 78. The fertility improved in native and DN and DND cross over previous year and it ranged between 84.41% (DR) to 87.93% (native). The hatchability ranged from 62.87 to 72.31% on TES and 74.47 to 82.12% on FES basis. Both the TES and FES hatchability decreased over previous year in all the populations except for DN cross. The hatchability was comparatively lower in DR population (62.87% and 74.47% on TES and FES basis).

Table 78. Summary of incubation and hatching in different populations

Strain/ cross	Year	No. of egg set	Fertility (%)	Hatchability (%)		No. of good chicks
				TES	FES	
Native	2018-19	8866	86.48	72.17	83.45	6399
	2019-20	20724	87.93	68.83	78.28	14266
<i>Dahlem Red</i>	2018-19	12302	86.21	66.08	76.65	8130
	2019-20	27256	84.41	62.87	74.47	17136
DN cross	2018-19	7328	86.36	69.81	80.83	5116
	2019-20	5622	89.06	73.14	82.12	4112
<i>Himsamridhi</i> (DNXD cross)	2018-19	42815	85.75	70.24	81.91	30075
	2019-20	55374	86.20	67.38	78.16	37312

Mortality

The chick mortality during 0 to 6 weeks of age ranged from 2.68 to 4.70 % during this year (Table 79). The mortality during 7 to 20 weeks of age ranged from 3.08 to 11.36%. The mortality during 21 to 40 weeks ranged from 1.91 to 3.66% in different populations. Mortality is reduced in comparison to previous year in all stocks. Non-specific causes like chilling, overcrowding / huddling and killing by rodents are among important causes of mortality. There is significant improvement in mortality during different periods compared to previous years.

Table 79. Mortality (%) of birds at different ages

Strain/cross	Year	Mortality (%)		
		0-6 wks	7-20 wks	21-40 wks
Native	2018-19	7.92	6.81	3.58
	2019-20	3.34	7.23	3.61
Dahlem Red	2018-19	5.59	10.63	3.95
	2019-20	3.56	11.36	3.66
DN cross	2018-19	7.61	14.55	4.73
	2019-20	4.70	3.08	1.91
Himsamridhi (DNXD cross)	2018-19	9.74	3.66	2.89
	2019-20	2.68	6.62	--

Performance evaluation of germplasm

The performance of *Dahlem Red*, Native and DN cross populations were evaluated (Table 80). The body weight at 4 weeks of age was 255.35, 189.64 and 220.10 g in *Dahlem Red*, Native and DN crosses, respectively. The ASM was 164, 182 and 178 days in DR, Native and DN cross populations. The average egg weight at 40 weeks of age was 52.40±0.26, 46.15±0.16 and 50.85±0.15 g in *Dahlem Red*, Native and DN population. The egg weight for *Dahlem Red* and Native eggs was similar to previous generation.

The Native germplasm (G-7) completed evaluation up to 40 weeks of age with hen-day egg production of 50.12 eggs/bird. The 40 week egg production showed improvement in Native population over previous year. The hen day egg production in *Dahlem Red* was 86.88 eggs/bird. The hen day egg production (HDEP) of 65.35, and 115.65 eggs/bird up to 40 and 52 weeks of age, respectively was recorded in DN cross. The 40 and 52 week egg production in DN cross showed improvement over previous year.

Table 80. Growth and production traits of different breeds/strains

Traits	Dahlem Red		Native		DN cross	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g) at						
Day old	1306	36.5 ± 0.2	680	32.5 ± 0.50	460	34.2 ± 0.25
4 wks	1272	255.4 ± 5.0	594	189.6 ± 3.9	446	220.1 ± 5.3
8 wks	1224	608.7 ± 8.81	580	490.5 ± 20.15	435	545.9 ± 15.67
20 wks	580	1580 ± 11.60	390	1450 ± 20.95	415	1495 ± 22.40
40 wks	500	1650 ± 22.50	328	1490 ± 23.80	160	1602 ± 28.60
FCR (0-8 wks)	-	3.90	-	4.80	-	4.30
ASM (d)	460	164	316	182	151	178
Egg weight (g)						
28 wks	100	49.67 ± 0.34	100	42.50 ± 0.10	100	48.10 ± 0.10
40 wks	100	52.40 ± 0.26	100	46.15 ± 0.16	50	50.85 ± 0.15
EP 40 wks (Nos.)						
HH	580	74.90	160	48.55	152	62.87
HD	500	86.88	155	50.12	146	65.33
Survivors'	495	87.76	150	1.78	141	67.15
EP 52 wks (Nos.)						
HH	-	-	-	-	152	109.48
HD	-	-	-	-	140	115.65
Survivors	-	-	-	-	125	118.20
EP 72 wks (Nos.)						
HH	-	-	186	*Pre-vious stock 89.14	-	-
HD	-	-	165	100.15	-	-
Survivors'	-	-	152	109.07	-	-

Evaluation of Himsamridhi

The DNXD cross (*Himsamridhi*) was evaluated under farm and field conditions up to 72 weeks of age in previous generation and up to 20 weeks of age during present

Table 81. Performance (*Himsamridhi*) at farm and field level

Traits	Farm		Field	
	N	Mean \pm SE	N	Mean \pm SE
Body wt (g) at day old	400	33.70 \pm 0.21	-	---
4 wks	370	230.2 \pm 3.35	550	225.4 \pm 2.18
8 wks	340	536.2 \pm 7.35	510	478.3 \pm 5.25
20 wks	134	1550. \pm 20.25	370	1430 \pm 10.58
40 wks	130	Under evaluation	-	-
FCR (0-4 wks)	-	3.65	-	-
ASM (d)	-	162	-	210
EP 72 wks (Nos.)	-	*Previous year stock	-	*Previous year stock
HH	-	162.20 (133)	-	146
HD	-	179.76 (120)	-	-
Survivors	-	205.44 (105)	-	-

generation (Table 81). The 20-week body weight was 1550 g in farm and 1430 g in field condition. The HHEP up to 72 weeks of age at field condition was 146 eggs in previous evaluation. Hen housed, Hen day and Survivors' egg production at 72 weeks of age from the previous year stock at farm was 1624, 182 and 178 eggs, respectively.

Germplasm supply

During the year, the centre supplied 68,597 chicks/growers

of *Himsamridhi*, native and other crosses to farmers (694 farm units including 411 Tribal farmers under TSP).

Revenue generation

The centre realised receipts of Rs 15.62 lakhs during the financial year on account of sale of various poultry products (chicks, eggs, culled birds) which was 6.03% of expenditure on feed cost (Rs 23.64 lacks).



Control Populations, ICAR-DPR, Hyderabad (Telangana)

Activities assigned

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

Action taken

- The random-bred control populations for egg and 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

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

A synthetic population that was originated from the AICRP and commercial populations at GAU, Anand was considered to be useful for this purpose and in the population available at Directorate of Poultry Research was under a mild positive selection for egg production. The selection was relaxed and mating was arranged among 70 randomly chosen males and 350 randomly chosen females to reproduce the base generation of the layer control LC-0. The LC-1 was reproduced with 60 sires and 300 dams in two hatches. The LC-2 generation was reproduced utilizing 40 sires and 200 dams in three hatches. The LC-4, LC-5, LC-6, LC-7 and L-8 generations were reproduced using 40 sires and 200 dams. LC-9 and LC-10 generation was reproduced using 32 sires and 128 dams and 37 sires and 74 dams, respectively. From LC-11 generation was reproduced with 50 sires and 200 dam. The inbreeding coefficient was kept at minimum level. At

the time of housing only two males per sire family and two females per dam family were housed for recording of production and other body weight traits according to the technical programme.

Regeneration of LC-15 generation

The number of sires and dams used to regenerate LC-15 generation, effective population size and rate of inbreeding are presented in Table 82.

Table 82. Number of sires and dams, effective population size and rate of inbreeding over generations

Gen.	No. of Sires	No. of Dams	Effective population size (Ne)	Rate of inbreeding (ΔF)
LC-7	40	200	133.33	0.00250
LC-8	40	200	133.33	0.00250
LC-9	32	128	102.40	0.00488
LC-10	37	74	98.66	0.00507
LC-11	50	200	160.00	0.00313
LC-12	50	200	160.00	0.003
LC-13	40	200	133.33	0.0025
LC-14	25	100	80.00	0.0062
LC-15	25	125	83.33	0.006

Incubation records

Incubation records of LC-14 generation in layer control population have been presented in Table 83. Fertility, hatchability on total eggs set and hatchability on fertile eggs set respectively were 81, 68 and 82%. Fertility and hatchability on TES decreased in the current generation as compared to previous generation.

Table 83. Incubation records layer control population

Gen	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	80.7	47.8
LC-14	81.0	82.0	68.0
LC-15	80.71	95.3	76.9

Production performance

During the year 2018-19, the birds of LC-13 generation were evaluated up to 72 weeks of age. The performance of control population and their regression value (time trend of control) has been presented in the following Table 84. The traits like body weight at 16 and 40 weeks of age, age at sexual maturity, 40 weeks egg weight and egg production to 40 weeks and 64 weeks (up to LC-13) showed non-significant change and the control population appears to be stable for all the traits for last eleven generations.

Table 84. Performance of layer control population for growth and production traits

Gen.	Body weight (g)		ASM (days)	Egg weight 40 wks (g)	Egg Production (Nos.)	
	16 wks	40 wks			40 wks	64 wks
LC-7	978	1511	148.1	50.90	93.13	189.1
LC-8	1010	1473	151.6	52.65	85.44	173.1
LC-9	1048	1510	154.9	52.91	91.47	200.7
LC-10	954	1508	155.4	53.28	92.64	194.4
LC-11	886	1497	156.4	51.28	94.90	223
LC-12	914	1522	150.1	52.88	98.00	224
LC-13	880	1492	150.6	51.11	107.69	221
LC-14	885	1624	155.0	52.43	97.74	217
b±S.E	-21.08* ± 6.17	1.01^{NS} ± 3.29	0.35^{NS} ± 0.49	-0.02^{NS} ± 0.21	2.57^{NS} ± 0.83	7.87 ± 2.07*

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

During the period G-18 generation of the control broiler was evaluated for juvenile traits and G-17 generation for production traits.

Incubation records

Incubation records of G-18 generation in broiler control population have been presented in Table 85. Percent fertility, percent hatchability on total eggs set and percent hatchability on fertile eggs set respectively were 85.32, 79.92 and 93.66. Hatchability was improved in the current generation as compared to previous generation.

Table 85. 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
G-17	88.64	79.86	90.10
G-18	85.32	79.92	93.66

Juvenile body weights

Performance of juvenile traits in control broiler population over 18 generation is presented in Table 86. During the current generation body weight at 5 weeks and 6 weeks respectively were 755g and 1042g. After six weeks of age 500 female chicks and 150 male chicks representing all the sires and dams were saved and were being maintained under restricted feeding schedule. At the time of housing only 2 males per sire family 2 females per dam family were housed for recording of production traits. The regression estimates of generation mean on generation number for 5 week body weight and 6 week body weight showed non significant changes over generations indicating the stability of the broiler control population for juvenile body weights.

Table 86. Performance of juvenile body weights in broiler control population

Gen	5 WK body weight	6 WK body weight
G-1	822	1060
G-2	872	1141
G-3	731	995
G-4	897	1195
G-5	907	1106
G-6	672	891
G-7	592	783
G-8	929	1215
G-9	626	964
G-10	578	829
G-11	522	720
G-12	731	1156
G-13	573	993
G-14	520	663
G-15	570	836
G-16	734	951
G-17	740	930
G-18	755	1042
b±S.E	-11.79±5.65^{NS}	-11.37±7.03^{NS}

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 87. 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 87. The regression estimates of generation means on generation number (G-0 to G-17) showed non-significant changes over the generations in all the traits (Table 87) indicating the stability of the broiler control.

Table 87. Growth and production performance of broiler control population over generations

Gen.	BW 20 WK (g)	BW 40 WK (g)	ASM (days)	EWT 32 WK (g)	EWT 40 WK (g)	Egg Prod 40 WK (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
G-17	2222	2957	183	53.15	55.58	50.44
b±S.E	-22.83 ± 10.29*	-25.72 ± 8.39**	1.19 ± 0.26**	-0.05 ± 0.05^{NS}	-0.06 ± 0.07^{NS}	-0.13 ± 0.26^{NS}



Critical Observations



KVASU, Mannuthy

Accomplishments and achievements

1. This centre has evaluated the S-4 generation of native chicken up to 40 weeks of age, IWN (S-31) and IWP (S-31) layer lines and their crosses for production traits up to 64 weeks of age.
2. Hen day egg production up to 40 weeks of age in Native chicken was 82.3 ± 1.10 eggs which has decreased marginally by one egg.
3. The hen day egg production up to 64 weeks of age in S-31 generation increased by 4.5 eggs in IWN strain and decreased by 10 eggs in IWP strain.
4. Hen housed egg production recorded up to 72 weeks of age was 306.3 ± 2.35 and 302.9 ± 3.08 eggs in IWN and IWP strains respectively.
5. The centre distributed a total of 1,07,142 chicken germplasm to farmers during the year.
6. Population of *Tellichery* breed is being maintained.
7. Two way cross (IWN x Native) was produced.
8. The centre has generated revenue of Rs. 19.30 lakhs, which was 65.80 % of the total expenditure on feed (Rs. 29.33 lakhs).

Short fall

1. The presentation and interpretation of data need to be improved.

Suggestions for further improvement

1. Egg quality analysis of layer strains needs to be carried out as given in the technical program.
2. Efforts should be made for development of a new location specific variety.

AAU, Anand

Accomplishments and achievements

1. IWN and IWP strains (S-0) along with control layer population was evaluated up to 74 weeks of age. Hen housed egg production up to 72 weeks of age was higher in IWN (298.8 ± 2.73) than IWP (284.7 ± 3.00) line.
2. The S-8 generation of IWD and IWK strains was evaluated up to 40 weeks of age, with HHEP of 116.74 ± 1.3 and 114.71 ± 1.31 , respectively.
3. The S-0 generation of *Ankleshwar* chicken was evaluated up to 40 weeks of age and S-1 generation was generated.
4. The centre supplied a total of 62,530 number of germplasm during the year 2019-20.
5. The center has generated the revenue of Rs. 21.73 lakhs during the reporting year (2019-20), which was 52.74 % of the total expenditure of feed cost (41.20 lakhs).

Short fall

1. Genetic parameters such as heritability, genetic and phenotypic correlations of various traits of IWN and IWP strains are not reported.
2. Frequency distribution of egg production in IWN, IWP, IWD and IWK strains is not reported.
3. Germplasm supply and revenue generation need to be further improved.

Suggestions for further improvement

1. Pedigree mating and improvement of *Ankaleshwar* breed.
2. Efforts should be made to increase the revenue generation.
3. Egg quality analysis of layer strains needs to be carried out as given in the technical program.

KVAFSU, Bengaluru

Accomplishment and achievements

1. Evaluated the performance of native chicken population (S-3), PB-1 (S-12) and PB-2 (S-25) for economic traits.
2. Body weight at 20 and 40 weeks of age was 1208 and 1594 g, respectively in local chicken (S-3). The average age at sexual maturity was 165.7 days.
3. Body weights at 5 weeks of age in PB-1, PB-2 and Control lines were 1247, 1093 and 717.6 g, respectively.
4. The average phenotypic and genetic response of body weight at 5 week over 13 generations in PB-1 was 19.4 and 30.7 g, respectively. Corresponding values in PB-2 at 5 week over 14 generations was 9.99 and 19.45 g, respectively.
5. PB-1 x PB-2 cross attained 1920 g at 7 weeks of age in field conditions.
6. A total of 2,03,328 germplasm were supplied to 297 beneficiaries.
7. During the year 2019-20, the centre generated revenue of Rs. 58.47 lakhs which is 176% of expenditure on feed cost (Rs.33.26 lakhs).

Shortfalls

1. There is significant reduction in egg production in PB-1, PB-2 and Control lines.

Suggestions

1. To initiate selection in female birds for improving egg production.
2. Genetic parameters may be estimated and presented for important traits.

GADVASU, Ludhiana

Accomplishment and achievements

1. Evaluated the performance of native (*Punjab Brown*), PB-1 (S-12), PB-2 (S-44) and cross (PB-2 X Local) for economic traits.
2. Body weight of *Punjab Brown* at 8 and 20 weeks was 720.5, 1544 and 664.9, 1286 g, respectively in male and female. Egg production up to 40 weeks was 67.26 eggs with egg weight of 49.85 g.
3. Average body weight at 5 weeks of age was 1125, 1049 and 774.8 g in PB-1, PB-2 and Control lines, respectively.
4. Egg production up to 40 weeks of age in PB-1, PB-2 and Control lines were 59.38, 57.38 and 58.65 eggs, respectively.
5. Genetic response over last 12 generations for 5 week body weight was 11.84 g in PB-1 and 19.11 g in PB-2 population.
6. A total of 94,699 germplasm were supplied.
7. During the year 2019-20, the centre generated revenue of Rs. 21.37 lakhs which was 87% of expenditure on feed cost (Rs. 24.67 lakhs).

Shortfalls

1. Body weights at 5 week of age and egg production up to 40 weeks in PB-1 and PB-2 lines were reduced compared to previous generation.
2. Pedigree mating and improvement of *Punjab Brown* breed to be initiated.

Suggestions

1. Efforts should be made for the development of a new location specific variety.
2. Efforts should be made for further improvement in germplasm supply.

CARI, Izatnagar

Accomplishment and achievements

1. Evaluated the performance of native (S-4), CSML (S-17), CSFL (S-17) and CSML X Desi cross for economic traits.
2. Body weight of local native chicken germplasm (S-4) at 6, 8 and 12 weeks age was 373.5, 617.5 and 941.1g, respectively.
3. Egg production up to 40 weeks in CSML and CSFL lines were 68.6 and 68.3 eggs, respectively.
4. A total of 38,833 germplasm were distributed.
5. The centre generated the revenue of Rs. 29.79 lakhs.

Shortfalls

1. Growth performance of native and CSML x native cross reduced compared to previous evaluation.
2. Mortality is higher during grower phase.
3. Germplasm supply was low.

Suggestions

1. Proper biosecurity needs to be maintained in the farm to reduce the mortality.
2. Efforts should be made to improve the germplasm supply.
3. Efforts should be made for development of a new location specific variety.

OUAT, Bhubaneswar

Accomplishment and achievements

1. Evaluated the performance of *Hansli* (S-3), CSML (S-8), CSFL (S-8), for economic traits.
2. The egg production up to 40 week in *Hansli* (S-3) was 25.09 eggs. Egg weight at 40 weeks was 43.55 g. ASM increased by 3 days compared to previous generation.
3. Body weight at 5 weeks of CSFL and CSML was 1,032 and 1,137 g, respectively.
4. Egg production up to 40 and 52 weeks was 53.78 and 85.12 eggs, respectively in CSFL line.

5. A total of 15,212 germplasm were supplied.
6. The centre has generated revenue of Rs. 4.54 lakhs, which is 32 percent of total feed cost.

Shortfalls

1. Centre needs to report the growth and egg production performance of control population to evaluate the genetic gain in pure lines.
2. Body weight at 5 weeks of CSML & CSFL was low.
3. Germplasm supply and revenue generation were low.

Suggestions

1. It is advised to provide the complete data of control population along with CSML and CSFL.
2. Efforts should be made to improve the germplasm supply and revenue generation.
3. Bio security measures to be followed strictly.
4. Efforts should be made for development of a new location specific variety.

ICAR RC, Agartala

Accomplishment and achievements

1. Centre evaluated Tripura Black, *Dahlem Red*, broiler dam line, BN cross and three-way cross (BND).
2. Performance of dual purpose chicken (BND cross) was evaluated at institute farm as well at farmer's field conditions.
3. A total of 25,275 germplasm were supplied to the farmers.
4. Centre generated revenue of Rs. 10.26 lakhs.

Shortfalls

1. The centre has to speed up the process of development of location specific variety.
2. Mortality in CSFL and BN cross is higher during grower phase (7-20 weeks of age).
3. Number of observations (data) for each trait in all the tables is missing in the annual report.

Suggestions

1. Efforts should be made to improve the standard of reporting of the results of the centre (Annual Report).
2. The mortality of all the stocks may be reported as per the format/duration given in the technical program.
3. Steps to be taken to reduce the mortality.
4. Germplasm supply needs to be improved.

NDVSU, Jabalpur

Accomplishment and achievements

1. Evaluated the performance of *Kadakhnath* (G-10), Jabalpur Colour (JBC) (G-10), CSFL and *Narmadanidhi* and maintained M-1 and M-2 populations.
2. The 6 week body weight was 430.6 and 715.3 g in *Kadakhnath* and Jabalpur population.

3. The hen housed egg production up to 40 weeks of age was 95.5 eggs in JBC and 58.2 eggs in *Kadakhnath*. Hen day egg production up to 40 weeks was 98.6 and 62.3 eggs, respectively.
4. In CSFL 40 week egg weight and production was 60.3 g and 61.0 eggs, respectively.
5. *Narmadanidhi* produced 71 eggs up to 40 weeks of age in farm condition. It produced 47.3, 90.2 and 179 eggs up to 40, 52 and 72 weeks, respectively in field conditions.
6. A total of 58,300 germplasm were supplied to 478 beneficiaries.
7. Centre generated revenue of Rs. 18.70 lakhs.

Shortfalls

1. The fertility and hatchability were reduced in JBC line.
2. Germplasm supply was low.

Suggestions

1. Proper monitoring of temperature and humidity during incubation in the hatchery to improve the hatchability.
2. Efforts should be made to improve the germplasm supply.
3. Detailed impact assessment of *Narmadanidhi* needs to be studied.

AAU, Guwahati

Accomplishments and achievements

1. Guwahati centre evaluated native, *Dahlem Red* and BN cross and *Kamrupa* up to 52 weeks of age and PB-2 birds up to 40 weeks of age at farm condition.
2. The performance of a flock of 99 nos. of Daothigir birds procured from Kokrajhar district was evaluated.
3. The BND cross (*Kamrupa*) was evaluated up to 52 weeks of age at farm and field conditions.
4. The centre supplied 44,906 germplasm to farmers.
5. The centre realized the receipt of Rs. 8.146 lakhs during the financial year which was 52.75% of the expenditure on feed cost (Rs.15.44 lakhs).

Short falls

1. The results of the present generation of native, PB-2 and *Dahlem Red* needs to be compared with the performance of their respective population in the previous generation. This was not done this year also.
2. Accordingly, the improvement and decline in the performance needs to be highlighted and discussed in the report.

Suggestions for further improvement

1. The mortality of all the stocks may be reported as per the format/duration given in the technical program.
2. The results of the present as well as previous generation of native, PB-2 and *Dahlem Red* need to be given in the tables for comparison purpose.

BAU, Ranchi

Accomplishments and achievements

1. The centre evaluated G-7 generation of native chicken population up to 64 weeks of age and G-8 up to 20 weeks of age.
2. The *Dahlem Red* was evaluated up to 64 weeks of age in G-6 generation and up to 52 weeks of age and G-7 generation.
3. *Jharsim* (E-7) was evaluated up to 64 weeks of age and E-8 was evaluated up to 20 weeks of age.
4. Centre supplied 35,185 germplasm to the farmers.
5. The centre realized a receipt of Rs. 6.50 lakhs during the financial year.

Short falls

1. The performance of *Jharsim* at field condition is not given as suggested in previous year.
2. Despite increase in the quantum of germplasm supplied, the revenue generation has further declined in the present year compared to previous year.
3. Number of observations (data) for each trait in all the tables is missing in the annual report.
4. Fertility and hatchability of *Dahlem Red* and PD-2 lines need to be given in the annual report.

Suggestions for further improvement

1. *Jharsim* should be evaluated in the field.
2. Efforts should be made to improve the germplasm supply and revenue generation.
3. The mortality of all the stocks may be reported as per the format/duration given in the technical program.
4. Reporting of results needs to be improved as per the reporting format.

MPUAT, Udaipur

Accomplishments and achievements

1. G-9 generation of Mewari breed was evaluated up to 52 weeks of age.
2. *Pratapdhan* was evaluated for production traits up to 72 weeks of age during E-8.
3. *Pratapdhan* (E-9) was reproduced and evaluated up to 20 weeks of age.
4. RIR and CSFL populations were regenerated and being maintained at the centre.
5. A total of 44,772 germplasm was supplied.
6. The centre realized a receipt of Rs. 9.66 lakhs during the current financial year which is 75.75% of expenditure on feed cost (Rs. 12.76 lakhs).

Short falls

1. Both germplasm supply and revenue generation of the centre was less compared to the previous generation.
2. Hen housed and hen day egg production up to 40 weeks of age in *Mewari* breed has decreased in G-9 generation as compared to G-8 generation.
3. The performance evaluation of RIR, CSFL and BN cross is not reported.
4. Please look into the number of hen housed and number of survivors' (for egg production) at 40 and 52 weeks of age and mortality during the corresponding period.

Suggestions for further improvement

1. Efforts should be made to improve the germplasm supply and revenue generation.
2. Efforts should be made to improve the standard of reporting of the results of the centre (Annual Report).
3. The mortality of all the stocks may be reported as per the format/duration given in the technical program.

CSKHPKV, Palampur

Accomplishments and achievements

1. Centre has evaluated native (G-6), *Dahlem Red* and DN cross, populations for growth and production traits.
2. *Himsamridhi* (DND cross) was evaluated at farm and field level up to 52 weeks of age for growth and production traits.
3. A total of 44,584 germplasm supplied.
4. The centre generated revenue of Rs. 13.19 lakhs which is 69.78% of the expenditure on feed cost (Rs.18.90 lakhs).

Short falls

1. The results on the performance of the present generation of native and *Dahlem Red* populations need to be compared with the performance of their respective population in the previous generation. Accordingly the improvement and decline, if any in the performance needs to be highlighted and discussed in the report.
2. Mortality during 7-20 weeks of age was high in *Dahlem Red* and DN cross.

Suggestions

1. Efforts should be made to improve the germplasm supply and revenue generation.
2. The results should be compared with previous generation to know the trend.



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, electricity 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	Bihar Animal Sciences University, Patna	Bihar
2	West Bengal University of Animal and Fishery Sciences, Kolkata	West Bengal
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	Andhra Pradesh
12	ICAR Research Complex for NEH Region, Umiam, Barapani	Meghalaya



Technical Program

- Technical program envisaged for all the centres is same except for the target of supplying chicks/fertile eggs.
- All the centres will procure parents (males of male line and females of female line) of improved chicken germplasm (*Vanaraja*, *Gramapriya* and *Srinidhi*) from the ICAR-Directorate of Poultry Research, Hyderabad. Day old parent chicks will be reared under standard management practices as per guidelines provided in the breeder manual supplied by the Directorate at the respective centre.
- Adult male and females 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) period will be done. Egg production and egg weight at every 14 day intervals during egg laying period (21-72 weeks) will be recorded.
- Analysis, documentation and reporting of the data at regular intervals

Table 2. Targets for germplasm supply for different Centres

S.No	Centre	Target (Nos.)	Achievement
1	Bihar Animal Sciences University, Patna	50,000	69,435
2	West Bengal University of Animal and Fishery Sciences, Kolkata	1,00,000	11,053
3	Regional Centre, ICAR Research complex for NEH Region, Jharnapani,	70,000	79,375
4	ICAR-National Organic Farming Research Institute, Gangtok	80,000	89,826
5	Regional Centre, ICAR Research complex for NEH Region, Imphal	60,000	37,088
6	Tamil Nadu Veterinary and Animal Sciences University, Hosur	1,00,000	1,36,183
7	ICAR-Central Coastal Agricultural Research Institute, Panji, Goa	50,000	39,893
8	ICAR-Central Island Agricultural Research Institute, Port Blair	50,000	16,709
9	PVNR Telangana Veterinary University, Warangal	50,000	40,464
10	Sri Venkateswara Veterinary University, Tirupati	50,000	32,290
11	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	50,000	18,605
12	ICAR Research Complex for NEH Region, Umiam, Barapani	50,000	12,606



Bihar Animal Sciences University, Patna

Activities 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

A total of 329 male and 1760 female parents of *Vanaraja* and 118 male and 590 female parents of *Gramapriya* were reared at Patna centre. The chicks were reared under standard management practices in a deep litter system. The average chick mortality was below 4.3% across all the batches. Body weight of parent stock was recorded at 2 weeks interval. Males were found to be heavier than the females in all the age groups. At 20 weeks of age the average body weight of *Vanaraja* male and female parent was 3115.58 ± 62.90 g and 1770.35 ± 40.27 g respectively.

Egg production

The *Vanaraja* parent attained the 3% egg production in 176 days of age. The average age at 10% egg production was recorded to be 181 days. Monthly egg production ranged from 49.80% to 90.39%. The average egg weight was 52.02 ± 0.11 g at the age of 40 weeks.

Fertility and hatchability

A total of 1,35,970 eggs were set in the incubator during the period under report. The fertility ranged from 62.33% to 89.67% and overall percentage was 78.95%. The overall hatchability percentage on TES was 65.71% and on FES was 73.25%.

Germplasm supply

A total of 69435 day old chicks were distributed during the period under report (Table 3). Out of total chicks 72% were the day-old chicks and rest were grown up chicks. The birds were distributed through various agencies like ATMA, KVKs and NGOs. Five demonstration and eight training programmes were also organized by the PSP, BVC, Patna with the help of ATMA, NASF & Farmers First for adoption of backyard poultry farming among the farming community. Birds have also been supplied to the farmers of Uttar Pradesh and Jharkhand. A total of Rs.13.39 lakhs was generated through sale of commercial chicks and fertile eggs.

Table 3. Month wise distribution of commercial chicks during the period 2019-20.

Month	Vanaraja		
	DOC	Grower	TOTAL
April-19	8684	800	9484
May-19	4732	1326	6058
June-19	4550	3000	7550
July-19	2602	1500	4102
Aug-19	3578	-	3578
Sept-19	3363	-	3363
Oct-19	1702	-	1702
Nov-19	3942	410	4352
Dec-19	5408	6125	11533
Jan-20	5917	46	5963
Feb-20	4689	2190	6879
March-20	320	4551	4871
Total	49487	19943	69435

Table 4. Average body weight of *Vanaraja* chicks at different weeks of age (n= 150 birds).

Age (wks)	Male	Female
2	140.26±4.63	135.28±2.28
6	535.28±12.22	421.38±12.06
10	1902.50±63.11	1235.21±28.81
14	2280.40±42.52	1840.42±24.79
18	2650.72±49.85	2142.83±33.31
22	2825.32±65.88	2445.47±36.56
26	3082.59±68.43	2860.46±47.72
30	3150.58±3.73	2776.42±3.16
34	3231.18±12.11	2930.61±10.52

Field performance and feedback from the beneficiaries

The farmers reared the *Vanaraja* and *Gramapriya* birds under intensive, semi intensive and extensive system but it was mostly backyard free range system. The performance details are presented in Table 4. Under intensive system farmers used to maintain the birds in the pens made up of bamboo and wirenet. The birds are allowed to maintain under extensive system of rearing. Mortality of chicks upto 3 months of age is a great concern as reported by the farmers. Fowl cholera and respiratory disease complex are the major problems faced by the farmers. Poultry farming is becoming popular enterprises in this state. The SHG members are selling their eggs through evening egg shop in local market. Due to the larger size and brownish colour of the egg, its demand is very high and they get

higher price. Eggs are sold usually at the rate of Rs. 10 – 12 per egg. Birds are sold at the rate of Rs. 130-140 per kg live weight basis. The farmers are increasing the economic status of the family. The farmers are satisfied on the performance of *Vanaraja* but they are concerned with the high mortality of birds. The farmers were trained in Poultry Farming through ATMA, NASF, KM and Farmers First Project of different districts of Bihar.

Constraints

- Mortality of chicks during their early age particularly during the winter season is a great problem
- During the month of December and January, farmers do not prefer to take chicks due to severe winter
- The high cost of poultry feed



West Bengal University of Animal & Fishery Sciences, Kolkata

Activities 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

This centre maintained only *Vanaraja* parents during the year. Three batches of *Vanaraja* parents were reared, out of which, two batches were in laying stage (till 31.3.2020). Batch Nos. 30 and 31 perished by 31.3.2020. A total of 342 females and 75 males young parents (Batch No 32) of *Vanaraja* were in position as on 01st April 2020.

The chicks were fed *ad libitum* till 6 weeks of age with balanced diet. Thereafter feed restriction was followed as per *Vanaraja* breeders' manual to maintain the body weight during laying period. The average body weight at 21 weeks of age in male and female parents was 2455 and 2175 g respectively (Table 5). Body weights are close to the standard body weight as per Breeders' manual indicating good feeding and management practices in the farm including feed restriction beyond 6 weeks of age.

Table 5. Mean Body weight (g) of *Vanaraja* parent stock

Age (wks)	Male	Female
4	393.3	350.0
8	880.0	716.6
12	1337.5	1145.0
18	2150.0	1755.0
21	2455.0	2175.0

Egg production

Average age at first lay has been recorded as 172 days (24.5 weeks) with a range of 135-210 days in two batches. Peak HDEP (79.0 %) was achieved at 39 weeks of age in Batch No. 30. The egg production to the tune of 50% was achieved at the age of 29th week in Batch 31. Thus rate of egg production in the centre is good indicating ideal management practices resulting in optimum production from the birds. Average egg weight at 40 weeks of age was 61g for Batch No 30 and 43g at 29 weeks in Batch No. 31. The egg weight increased according to the advancement in age of birds following standard norms of *Vanaraja* birds.

Hatching performance

In Batch No. 30 maximum hatchability on total eggs set (TES) and fertile eggs set (FES) achieved at 38th and 39th week with values of 69.5 and 89 % respectively. Hatchability on total eggs set (TES) and fertile eggs set (FES) for Batch No. 31 at 29th week were 74 and 85% respectively.

Germplasm supply and Revenue generation

A total of 12,963 day old chicks (DOCs) of *Vanaraja* were produced. Out of which 11053 chicks were distributed during the year 2019-20. The centre has generated a total revenue of Rs. 2,79,210 during the period. The beneficiaries were poultry farmers receiving chicks either directly from PSP centre or via ICAR Institutes and TSP projects.

Farmers benefitted

Approximately 18 (Eighteen) farmers have been benefitted either directly from the project or via intermediate institutions.

Constraints

Batches reared during mid to later part of 2018-19 totally perished and two batches reared in 2019-20 also perished. Hence chick production was far below the target fixed for the centre.



Regional Centre of ICAR Research Complex, Jharnapani, Nagaland

Activities assigned

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

Work done

Parent stock

One batch each in *Vanaraja* and *Srinidhi* parents were reared at Jharnapani during the reporting period. A total of 862 parents of *Vanaraja* were in position at the end of the financial year. The body weights of *Vanaraja* and *Srinidhi* parents at different weeks are presented in Table 6.

Egg production

The HHEP in *Vanaraja* and *Srinidhi* parents at different weeks are presented in Table 7. The percent egg production was low in both *Vanaraja* and *Srinidhi* parents.

Table 7. Egg production (HHEP) in parents of *Vanaraja* and *Srinidhi*

Age (Wks)	<i>Vanaraja</i>	<i>Srinidhi</i>
28	5.21	14.59
36	55.22	27.88
40	63.12	50.00
52	40.13	53.48
64	49.66	-
72	52.68	-

Table 6. Body weights (g) in *Vanaraja* and *Srinidhi* parents lines

Age (wks)	<i>Vanaraja</i>		<i>Srinidhi</i>	
	Male line	Female line	Male line	Female line
4	387±10.66	294±5.92	389±6.01	177±5.45
6	581±15.09	401±9.36	984±19.60	315±6.69
12	1047±31.22	991±17.47	1779±38.33	779±18.19
16	2210±58.63	1176±27.20	2126±46.31	923±20.79
20	2034±58.01	1607±40.81	2418±52.12	1606±15.77

Hatching performance

The average fertility was 83.77% and hatchability on TES and FES were 58.06% and 69.37% respectively in *Vanaraja* parents. In *Srinidhi* parents the average fertility was 76.46% and hatchability on TES and FES were 50.15% and 63.96% respectively.

Germplasm supply

A total of 79,375 improved chicken germplasm was distributed to the beneficiaries including farmers, KVKs, NGOs working in Nagaland and neighbouring states and different state/central sponsored program during the year 2019-20. A total of Rs. 34.63 lakhs revenue was generated under PSP at Jharnapani Centre. Under Tribal Sub Plan 478 beneficiaries were covered from different districts in Nagaland and altogether 25173 nos. of day old chicks and grown up chicks of *Vanaraja* and *Srinidhi* varieties were provided to the beneficiaries. The performance of *Vanaraja* birds under field condition was appraised from the demonstration unit established in previous year.

Feedback from farmers

This project has got much popularity in the state and there is enormous demand of grown-up chicks from different districts of Nagaland and nearby states Arunachal Pradesh, Assam and Meghalaya. The germplasm produced in the project has reached to almost each corner of the state though; cost of transportation is very high due to road condition in hilly terrain. Nevertheless, the feedback from different sector of state is very much encouraging. This project can successfully meet the demand of eggs and meat and can generate subsidiary source of income, provide gainful employment to unemployed youth and will benefit the poor farmers in Nagaland in coming days.

Constraints

- Irregular power supply throughout the year affecting hatchery operation.
- Urgent requirement of another setter, as there is only one setter which when malfunctions creates inconveniences.
- Higher rate of chick mortality during winter season.
- High feed cost



ICAR-National Organic Farming Research Institute, Gangtok, Sikkim

Activities 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 2019-20. The body weight of male and female parents of *Vanaraja* at 20 weeks of age is given in Table 8.

Table 8. Body weight (g) of *Vanaraja* birds up to 20 weeks of age

Age (wks)	Body weight (g)	
	Female line	Male line
4	258	289
6	395	440
12	1132	1244
16	1532	1734
20	1852	2289

Egg production

The average HDEP in *Vanaraja* was 49.45 (23-80 weeks) during the reporting period (Table 9). Peak production (72 %) was attained at 32-35 weeks of age. The egg

production was consistent throughout the laying period in both the batches.

Table 9. Egg production in *Vanaraja* parents birds (%)

Age (wks)	I batch	II batch
28	45.27	34.78
36	62.97	67.56
40	70.42	60.30
52	59.77	44.53
64	44.88	47.16
72	46.00	49.21
80	24.93	44.66
Average	49.75 (23-80 wks)	49.45 (23-80 wks)

Hatching performance

The average fertility and hatchability (TES) in *Vanaraja* female line of the two batches were 85.34% and 74.12% respectively. The fertility and hatchability is fairly good indicating ideal hatching conditions.

Germplasm supply

A total of 89826 improved chicken germplasm of *Vanaraja* was distributed to 3338 farmers (Table 10) covering 267 village habitats in Sikkim. An amount of Rs. 21.85 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 germplasm was distributed to tribal farmers along with inputs such as low cost housing facility, small poultry equipments, feed, medicine, etc.

Table 10. Details of chick distribution in Sikkim

Sl. No.	Mode of Supply	Number of <i>Vanaraja</i> chicks	No. of beneficiaries	No. of villages covered
1	Under TSP	83451	3301	242
2	Cash	6375	37	25
Grand Total		89826	3338	267

Feedback

Backyard poultry was 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

Activities 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

During the reporting year a batch of parent stock of *Vanaraja*, *Gramapriya* and *Srinidhi* were procured and maintained under deep litter system. The average body weight was recorded after every four weeks till 20th weeks

of age and the monthly mortality pattern was recorded and presented below.

Egg production

The average HHEP was 19 % (23-39 weeks) in *Vanaraja* and 41.28% (23-59 weeks) in *Gramapriya* during the reporting period.

Hatching performance

The average fertility was 82.84, 77.16 and 83.65% in *Vanaraja*, *Srinidhi* and *Gramapriya* parents, respectively. The hatchability was 66.21 (TES) and 80.12% (FES) in *Vanaraja*, 51.24 (TES) and 66.55% (FES) in *Srinidhi* and 65.77 and 78.35% in *Gramapriya* parents, respectively.

Germplasm supply

A total 37088 improved chicken germplasm was distributed to the farmers in Manipur. The centre has

Table 11. Body weight (g) in *Vanaraja* and *Srinidhi* parents

Age (wks)	<i>Vanaraja</i>		<i>Srinidhi</i>		<i>Gramapriya</i>	
	Male line	Female line	Male line	Female line	Male line	Female line
4	491.1±0.90	315.2±1.37	583.1±1.55	242.7±2.64	349.7±0.48	284.7±0.99
8	1385.9±1.41	952.8±1.76	1490.7±2.36	617.7±1.43	931.8±0.71	630.7±0.91
12	1681.9±1.65	1082.4±14.16	1884.2±1.99	874.7±1.26	1670.9±0.60	894.2±0.70
16	2498.9±2.73	1596.6±2.96	2578.3±3.51	1363.3±1.93	1987±1.72	1219.4±0.65
20	3000.3±3.11	2179±7.81	3125.4±4.96	1668±2.96	2443.1±0.83	1481.4±0.52

Table 12. Germplasm supply in Manipur

Sl.No	Beneficiaries (Farmers/ Household/ Villages)	District/State	Total No. of Chicks distributed
1	Murei village	Ukhrul	2850
2	Kharasom village	Ukhrul	3000
3	Kangchup Vil- lage(105)	Imphal West	3000
4	Khoupum (95)	Tamenglong	2750
5	Tousem (130)	Tamenglong	3200
6	Farmers (120)	Kamjong	3000
7	Farmers (105)	Chandel	3200
8	Farmers (85)	Imphal East	2500
9	Farmers (102)	Thoubal	2560
10	Household (50)	Kakching	2635
11	Household (62)	Senapati	2750
12	Household (50)	Bishnupur	2643
13	Household (40)	Churachandpur	3000
Total			37,088

generated Rs.15.27 lakhs of revenue during the year 2019-20 (Table 12).

Field performance and Feedback from the farmers

Poultry Seed Project (PSP) has got very much popularity in the state and there is enormous demand of chicks from different districts of Manipur. It has gained tremendous

popularity in both hill and valley districts of Manipur as *Vanaraja* and *Gramapriya* can reared as a backyard poultry moreover the quality of the meat and eggs is almost similar with desi poultry birds. The germplasm produced in this project has reach almost part of the Manipur Districts and this project can successfully meet the demand of meat and eggs, can generate subsidiary source of income, provide gainful employment to unemployed youth and will benefit the poor and marginal farmers of Manipur in coming days. The performance under filed conditions is presented in Table 13.

Table 13. Field performance of *Vanaraja* and *Gramapriya*

Parameters Age (wks)	<i>Vanaraja</i>		<i>Gramapriya</i>	
	Male	Female	Male	Female
4	364.42	312.42	322.34	234.73
8	843.12	683.46	813.23	576.21
12	1382.72	912.65	1436.54	826.75
16	1964.21	1433.42	1714.46	1177.45
20	2683.16	1675.05	1964.34	1246.41

Constraints

- Outbreak of Fowl cholera in poultry farm
- Outbreak of Colibacillosis in the flock
- Due to electricity problem in the field condition, the farmers are facing problem in brooding which result in high mortality of chicks.



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

Activities 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

One batch (IV batch) of *Vanaraja* parents was reared at CPPM, Hosur during the reporting period and the batch was in laying phase between 22 and 74 weeks of age. Similarly, two batches (III and IV batch) of *Gramapriya* were reared at CPPM, Hosur during the reporting period. The III batch of *Gramapriya* was in laying phase between 75 and 79 weeks of age and the IV batch of *Gramapriya* was in laying phase between 22 and 74 weeks of age. A total of 400 and 631 parents of *Vanaraja* and *Gramapriya* were in position, respectively at the end of reporting period.

Egg production

The hen day and hen housed egg production in *Vanaraja* and *Gramapriya* are presented in Table 14. The hen day egg production ranged from 78 to 50% during 22 – 72 weeks of age with hen housed egg production of 174 at 72 weeks of age in *Vanaraja*. Similarly, the hen day egg production ranged from 64 to 50% during 22 – 72 weeks of age with hen housed egg production of 159 at 72 weeks of age in *Gramapriya*.

Table 14. Egg production in *Vanaraja* and *Gramapriya* parents

Age (wks)	<i>Vanaraja</i> (IV batch)		<i>Gramapriya</i> (IV batch)	
	HDEP (%)	HHEP (No.)	HDEP (%)	HHEP (No.)
24	47.8	2.9	6.8	4.4
28	75.9	16.4	63.6	19.8
32	78.0	35.5	61.4	36.5
36	58.7	51.6	63.3	53.0
40	57.6	67.8	58.5	68.7
44	55.6	82.4	54.6	82.2
48	50.3	96.6	55.4	96.1
52	50.8	109.9	52.5	109.1
56	51.4	123.0	50.0	121.1
60	47.0	135.3	53.0	131.7
64	41.8	147.1	52.4	141.6
68	51.3	159.1	50.5	150.7
72	56.4	173.5	46.8	158.9

Hatching performance

The fertility and hatchability of *Vanaraja* and *Gramapriya* parents are presented in Table 15. The fertility varied from 86 to 91% and hatchability (TES) ranged from 75 to 84% in *Vanaraja* (IV batch) parent. Similarly, the fertility varied from 82 to 88% and hatchability (TES) ranged from 74 to 78% in *Gramapriya* (IV batch) parents.

Table 15. Hatching performance in Vanaraja and Gramapriya parents

Age (wks)	Vanaraja (III batch)			Gramapriya (III batch)		
	Fertility (%)	Hatchability (%)		Fertility (%)	Hatchability (%)	
		TES	FES		TES	FES
32	88	77.1	87.7	84.8	75.5	89.1
42	91.5	84.2	92.0	87.5	76.8	87.7
52	85.3	78.8	92.3	87.8	78.3	89.1
62	86	75.0	89.9	82.2	73.7	89.6
72	88	81.6	89.5	86.7	76.0	87.7

Germplasm supply

A total of 1,36,183 improved rural chicken germplasm of *Vanaraja* and *Gramapriya* were distributed to 1182 beneficiaries including farmers and entrepreneurs throughout Tamil Nadu. The Centre has generated total revenue of Rs. 30.42 lakhs during 2019-20. Month wise distribution of germplasm is presented in Table 16.

Feedback from farmers

An On-Farm trial was conducted at Dharmapuri by KVK with *Gramapriya* chicken. The chicks were supplied from PSP Centre, CPPM, Hosur. The birds were reared under intensive system up to 4 weeks after which the birds were reared under semi-intensive system of rearing. The hatch weight was 31.86 g and age at first egg was 170 days.

Table 16. Month wise distribution of the germplasm (2019-20)

S.No.	Month	Germplasm supply (No.)		
		Vanaraja	Gramapriya	Total
1.	April 2019	0	3,368	3,368
2.	May 2019	2,731	6,508	9,239
3.	June 2019	4,919	10,941	15,860
4.	July 2019	5,122	14,045	19,167
5.	August 2019	4,475	8,271	12,746
6.	September 2019	4,985	9,838	14,823
7.	October 2019	3,019	7,795	10,814
8.	November 2019	2,761	7,854	10,615
9.	December 2019	3,667	7,857	11,524
10.	January 2020	2,823	6,810	9,633
11.	February 2020	2,795	5,798	8,593
12.	March 2020	3,606	6,195	9,801
Total		40,903	95,280*	1,36,183

*Including 15,420 hatching eggs

Livability during 0-12 weeks is 95%. The egg weight was 51.12 g and the hatchability was 85%. The egg production was 162 under semi-intensive system or rearing with adult livability of 97%.



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

Activities assigned

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

Work done

Parent stock

One batch of *Srinidhi* (315), *Vanaraja* (423) and *Krishibro* (660) parents were reared at ICAR-CCARI, Goa during the year 2019-20. The body weight of female and male parent of *Srinidhi* was 1568 and 3480g at 40 week of age, respectively. The body weight of parent stock *Krishibro* chicks was 698.85g at 9th week of age.

The age at sexual maturity was 147 days in *Srinidhi* with average 68-96% egg weight of 52-55g. The average hen

housed egg production was 34.43% during 50th -72nd weeks of age in *Srinidhi* parents.

Germplasm supply

A total of 39,893 improved chicken germplasm was distributed to 1305 farmers in Goa, Karnataka and Maharashtra. The total revenue generation was Rs.7.54 lakhs.

Field performance

Birds (n=100)	Average body weight of birds at 5 months age (Male)	Average body weight of birds at 5 months age (Female)	Average Egg yield / year
<i>Gramapriya</i>	1.66	1.54	171
<i>Srinidhi</i>	2.15	1.8	138



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

Activities assigned

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

Work done

Parent stock

Two batches of *Vanaraja* parents were reared under deep litter system during the period. The growing period body weights are presented in Table 18. A total of 398 female and 40 male *Vanaraja* breeders were reared during the period. The age at sexual maturity (ASM) was 190 days. The age at 5% egg production was 220 days. The body weight during the period of 27 to 45 weeks of age ranged from 3.55±0.55kg to 4.30±0.6 kg males and 2.75±0.3 to 3.45±0.8kg for females. Production performance of *Vanaraja* breeders were assessed on the basis of hen-

Table 18. Body weight (g) in *Vanaraja* parents

Age (wks)	Body Weight (g)	
	Male	Female
0 day	35.6 ± 1.37	34.9 ± 1.34
4	447.0±10.53	384.0±11.05
16	1822.9±81.13	1293.3±46.47
20	2951.1±147.9	2191.6±63.39

day egg production (HDEP) and hatchability percentage. HDEP was found highest (37.87%) in 40th week of age. Hatchability percent was maximum in 36th week and lowest in 24th week (Table19).

Germplasm supply

During the period a total of 16709 germplasms of fertile eggs were supplied to 180 farmers. A revenue of Rs.1.66 lakhs was generated.

Feedback from the field

A total of five farmers have successfully adopted poultry farming with *Vanaraja* birds. Flock size ranged from 30 to 150 birds per batch. Average body weight at marketing is 1.8 kgs and they sold @ Rs.200 per kg.

Table 19. Production and reproduction performance of *Vanaraja* breeders

Age (wks)	HDEP (%)	Hatchability (%)
24	2.13	31.85
28	12.93	35.64
32	25.92	36.78
36	30.36	55.46
40	36.15	53.42
44	29.98	56.78
52	26.96	57.17
58	21.34	58.38
64	20.58	55.64



ICAR Research Complex for NEH Region, Umiam, Meghalaya

Activities assigned

- Maintenance of parent stock for continuous supply of fertile eggs, chicks of improved chicken varieties (*Vanaraja* and *Srinidhi*)
- Recording the performance of parents in the institute farm
- Collection of data on performance from farmers' field and reporting their feedbacks

Work done

Parent stock

Two batches of *Vanaraja* and *Srinidhi* parent stock were procured and reared under deep litter system at institute farm for production and supply of improved varieties of chicks. The growth performance of *Vanaraja* and *Srinidhi* parent lines were recorded and given in Table 20.

The reproductive performance of *Vanaraja* and *Srinidhi* parent layers has been studied in terms of age at sexual maturity, egg production, egg weight, fertility and hatchability up to 84th week of production under intensive system of rearing. The average age of sexual maturity of *Vanaraja* and *Srinidhi* parent lines were recorded to be 178 and 188 days respectively. The highest average hen day egg production was recorded during 40th week, both for *Vanaraja* (65.14%) and *Srinidhi* (52.75%) parent layers. The overall hen day egg production was found to be higher in *Vanaraja* (36.60%) compared to *Srinidhi* (29.47%) parent layers. However, the overall egg weight during the period was higher in *Srinidhi* (59.77 g) compared to *Vanaraja* (58.10 g). The fertility and hatchability rates during the period were found to be higher in *Vanaraja* (82.63% and 64.94%) compared to *Srinidhi* (80.19% and 60.00%) eggs.

Feedback from the field

The performance of *Vanaraja* and *Srinidhi* birds in the farmers fields and the farmers feed backs were recorded and presented below in Table 21 and 22.

Table 20. Body weights (g) in *Vanaraja* and *Srinidhi* male and female lines

Age (wks)	<i>Vanaraja</i>		<i>Srinidhi</i>	
	Male	Female	Male	Female
0	38.52 ± 1.01	36.23 ± 1.09	37.50 ± 2.10	36.54 ± 1.25
4	120.00 ± 10.05	111.00 ± 5.23	115.26 ± 5.20	88.35 ± 6.30
8	443.00 ± 11.56	222.34 ± 11.13	390.85 ± 20.26	285.75 ± 15.70
12	860.45 ± 25.73	660.00 ± 20.92	989.67 ± 75.42	686.24 ± 35.80
16	1620.00 ± 85.23	1490.00 ± 76.75	1380.26 ± 125.25	1298.22 ± 75.50
20	2335.56 ± 110.65	1865.46 ± 56.27	2760.25 ± 132.62	1580.05 ± 85.28
24	3090.20 ± 98.45	2330.85 ± 75.37	3420.65 ± 122.34	1635.20 ± 74.28
28	3340.30 ± 78.25	2450.27 ± 83.90	3595.24 ± 116.35	1762.90 ± 76.18
32	3455.20 ± 115.37	2570.20 ± 78.25	3715.50 ± 150.36	1850.75 ± 112.76
36	3610.20 ± 125.10	2650.50 ± 102.70	3912.36 ± 162.76	1894.28 ± 160.27

Table 21. Body weight (g) and mortality percentage of *Vanaraja* and *Srinidhi* birds at Farmers field

Age (wks)	Body weight (g)		Mortality (%)	
	<i>Vanaraja</i>	<i>Srinidhi</i>	<i>Vanaraja</i>	<i>Srinidhi</i>
4	330.25 ± 10.15	325.34 ± 15.35	-	-
6	393.23 ± 30.56	456.76 ± 35.76	2.50	3.25
8	690.37 ± 43.75	666.15 ± 57.43	2.74	1.35
10	985.32 ± 76.54	967.41 ± 67.43	1.64	2.78
12	1145.65 ± 85.23	1121.34 ± 47.78	1.06	1.30
14	1275.21 ± 66.48	1310.92 ± 69.82	1.39	1.87
16	1326.74 ± 80.95	1410.12 ± 89.23	0.00	0.85
18	1374.67 ± 87.12	1500.61 ± 79.22	0.00	0.32
20	1490.65 ± 64.29	1612.45 ± 90.25	0.32	0.00
22	1625.28 ± 88.19	1820.24 ± 82.65	0.00	0.00
24	1810.23 ± 201.25	1911.71 ± 185.28	0.00	0.00
26	1910.10 ± 107.44	2015.28 ± 101.25	0.00	0.00
32	2135.22 ± 100.25	2348.30 ± 150.18	0.00	0.00
36	2460.19 ± 125.28	2458.14 ± 110.25	0.00	0.00
40	2641.39 ± 198.74	2550.76 ± 114.40	0.00	0.00

Table 22. Production performance of *Vanaraja* and *Srinidhi* at farmer's fields

Performance traits	<i>Vanaraja</i>	<i>Srinidhi</i>
Age at first egg (days)	155.50 ± 3.50	150.20 ± 5.50
Body weight at first egg (g)	1652.34 ± 100.24	1678.35 ± 122.28
Average hen day egg production at 40 wks (%)	21.17	42.10
Average egg weight (g) at 40 wks	54.32 ± 0.35	55.20 ± 0.35

Germplasm supply

Total of 12,606 chicks were supplied with revenue of Rs.10.27 lakhs during the period. A total of 4905 numbers of *Vanaraja* and *Srinidhi* chicks along with equipments, feed, medicines etc. to 348 numbers of tribal farmers from different districts of Meghalaya were distributed 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 in the region.



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

Activities assigned

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

1562.17±67.45 g in male and female parents of *Vanaraja*. The hen day egg production was 32-42% in *Vanaraja* during 40-72 weeks of age with 60-70% hatchability. The age at first egg was 196 days.

Work done

Germplasm supply

Parent stock

A total of 18605 germplasm were distributed to farmers of Jammu and Kashmir during the year and generated Rs.4.03 lakhs revenue by sale of chicks and eggs.

The body weights were recorded and presented in Table 23. The body weight at 20 weeks was 2184.16±82.34 and

Table 23. Growth performance of *Vanaraja* parents

Age (Wks)	Male	Female
0 day	37.40 ± 0.82	34.81 ± 0.41
1	72.13 ± 2.32	68.21 ± 1.83
2	130.21 ± 3.56	100.32 ± 1.78
4	373.68 ± 6.89	336.42 ± 7.74
8	709.80 ± 23.34	688.12 ± 32.12
12	1113.64 ± 87.45	803.94 ± 76.23
16	1794.14 ± 112.23	1315.71 ± 103.36
20	2184.16 ± 82.34	1562.17 ± 67.45
24	2349.22 ± 65.54	1607.38 ± 48.34
28	3036.09 ± 62.23	2143.12 ± 52.23
32	3133.43 ± 68.23	2334.34 ± 43.34.
36	3023.34 ± 97.34	2358.65 ± 87.64



Sri Venkateswara Veterinary University, Tirupati

Activities assigned

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

Work done

Civil works

Construction of Hatchery building was completed.

Parent stock

During the year 2019-20 a total of 300 parents *Vanaraja* chicks were procured for replacement stock from the Directorate of Poultry Research, Hyderabad and are

being maintained in deep litter system. The body weight of *Vanaraja* at 20 weeks of age was 2210 and 1944 g in male and female parents respectively (Table 24). Age at sexual maturity was 141 days. The hen day egg production ranged from 16 % to 66% during 24 -40 wks period (Table 25) and the hatchability ranged from 44 to 79% from 24 to 36 wks period.

Germplasm supply

A total of 32,290 germplasm was supplied. An income of Rs. 4.06 lakhs was generated by selling of chicks, eggs and birds. A total of 1031 birds were distributed to the SC farmers in Yerpedu, Renigunta and Chandragiri mandal of Chittoor district. Along with birds, feed, feeders, waterers and night shelters were also supplied.

Table 24. Body weights of *Vanaraja* birds

Age (wks)	Male (g)	Female (g)
4	560 ± 3.52	430 ± 4.31
8	1108 ± 9.27	890 ± 10.34
12	1578 ± 35.38	1280 ± 25.65
20	2210 ± 64.21	1944 ± 53.42
40	3272 ± 70.22	2477 ± 66.37

Table 25. Production performance

Age (wks)	Egg wt (g)	HDEP (%)	Hatchability (%)
24	34.23	16	44
28	41.44	39	59
32	49.22	67	68
36	51.63	75	79



PVNR Telangana Veterinary University, Warangal

Activities assigned

- Construction of Civil works
- Maintenance of parent stock for continuous supply of fertile eggs, day old and grownup chicks of *Vanaraja*, *Gramapriya* and *Vanasree*.
- 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

About 462 *Vanaraja* parent stock were reared from March 2018 under deep litter system and 638 *Gramapriya* parent stock were reared from February 2019, under the deep litter system till grower stage and then shifted to cage system, whereas the *Vanasree* parent stock (630) now in grower stage are being reared under deep litter system. And recently, *Gramapriya* chicks (359) procured during March, 2020 are under deep litter system. The growing period body weights of *Gramapriya* are presented in Table 26.

Table 26. Body weight (g) in *Gramapriya*

Age (wks)	<i>Gramapriya</i>	
	Male	Female
6	520 ± 0.10	438 ± 0.10
12	1172 ± 0.20	765 ± 0.10
16	1576 ± 0.30	987 ± 0.20
20	2100 ± 0.20	1208 ± 0.20

Egg production

The average HDEP was 41.50 (28-72 weeks) and the egg production ranged between 34.43% to 27.82% from 28 to 72 weeks of age in *Vanaraja* parents (Table 27).

Table 27. Egg production (HDEP%) in *Vanaraja* parents

Age (wks)	<i>Vanaraja</i>		
	HDEP (Nos.)	HHEP (Nos.)	Egg weight (g)
40	46.70	51.18	45.28
52	41.25	52.20	48.32
72	46.70	27.82	53.18

The age at sexual maturity (ASM) was 156 days (22thwk) in *Gramapriya* female line. The highest egg production (73.36%) was recorded at 45th week of age. The average HDEP was 58.24 (22-56 weeks) and the egg production ranged between 19.20% to 47.40 % from 22 to 56 weeks of age in *Gramapriya* parents (Table 28).

Table 28. Egg production (HDEP%) in *Gramapriya* parents

Age (wks)	<i>Gramapriya</i>		
	HDEP (Nos.)	HHEP (Nos.)	Egg weight (g)
40	70.70	60.67	51.48
52	60.80	49.16	53.41

Hatching performance

The average fertility was 83.16% and hatchability was 66.43% in *Gramapriya* parents (Table 29).

Table 29. Hatching performance in *Vanaraja* and *Gramapriya* parents

Age (wks)	<i>Gramapriya</i>		
	Fertility (%)	Hatchability (%)	
		TES	FES
28	63.16	55.94	89.19
36	92.19	55.28	59.96
40	92.97	81.25	87.40
52	84.34	73.25	86.85
72	-	-	-
Average	83.16	66.43	80.85

Germplasm supply

A total of 6,957 *Vanaraja* germplasm and 33,507 chicks including 6026 fertile eggs of *Gramapriya* were distributed to the farmers (Table 30). The Station has generated total revenue of Rs. 5.82 lakhs during the year. About 170 farmers were benefitted and nearly 80 entrepreneurs were developed from the supply of day old chicks of both *Vanaraja* and *Gramapriya*

Feedback from farmers

A good demand for *Vanaraja* and *Gramapriya* germplasm was observed in Hyderabad and surrounding districts. A total of about 11 trainings were conducted on backyard poultry management to the farmers from Warangal as well as the nearby districts.

Table 30. Month wise distribution of the germplasm and revenue generation

Month	Germplasm supply (Nos.)		Revenue generation (Rs.)
	<i>Vanaraja</i>	<i>Gramapriya</i>	
April, 2019	1380	-	4710
May, 2019	1997	-	37368
June, 2019	1154	-	16798
July, 2019	537	-	12060
August, 2019	662	-	44660
September, 2019	576	-	21125
October, 2019	648	3438	51190
November, 2019	9	4072	50875
December, 2019	-	4794	46741
January, 2020	-	7110	126339
February, 2020	-	4251	63519
March, 2020	-	3816	106578
Fertile eggs	-	6026	-
Total	6957	33,507	5,81,963



Critical Observations

BAU, Patna

Accomplishments and achievements

- Two batches of parents were reared
- Supplied 69,435 chicks of *Vanaraja* to farmers
- Generated Rs. 13.39 lakhs of revenue
- Achieved the target of germplasm supply

Short fall

- Field data not provided

Suggestion for further improvement

- Field data to be collected

WBUAFS, Kolkata

Accomplishments and achievements

- Three batches of *Vanaraja* parents were reared
- Distributed 11,053 chicks of *Vanaraja* to farmers
- Generated an amount of Rs 2.79 lakhs revenue

Short fall

- Target of germplasm was not achieved
- Performance is very poor

Suggestion for further improvement

- Efforts should be made to meet the target of 1.0 lakh number of germplasm supply
- Bio-security should be improved to prevent disease occurrence

RC of ICAR Research Complex, Jharnapani

Accomplishments and achievements

- Two batches of parents one each *Vanaraja* and *Srinidhi* were reared
- A total of 79,375 improved chicken germplasm was distributed to the farmers
- An amount of Rs. 34.63 lakhs revenue was generated
- Centre has achieved the germplasm supply target

Shortfall

- Field data not provided

Suggestion for further improvement

- Data from field performance of birds should be recorded and reported

ICAR-NOFRI, Gangtok

Accomplishments and achievements

- Two batches of *Vanaraja* parents were in position
- Distributed 89826 chicks to the farmers in the rural and tribal areas of Sikkim
- An amount of Rs. 21.85 lakhs of revenue was generated
- The target supply was achieved

Short fall

- Field data not provided

Suggestion for further improvement

- Data from field performance of birds should be recorded and reported

RC of ICAR Research Complex, Imphal

Accomplishments and achievements

- Three batches of *Vanaraja*, *Gramapriya* and *Srinidhi* parents were reared
- The centre has supplied 37,088 chicks to farmers
- An amount of Rs. 15.27 lakhs of revenue was generated
- Field data collected

Short falls

- Target of germplasm was not achieved

Suggestion for further improvement

- Biosecurity measures to be rigorous at the centre and disease occurrence to be minimized

TANUVAS, Hosur

Accomplishments and achievements

- Three batches of parents were in position
- Distributed 1,36,183 chicks of *Vanaraja* and *Gramapriya* to the farmers in Tamil Nadu
- Generated an amount of Rs. 30.42 lakhs revenue
- Field data collected
- The centre has achieved the target supply

Short fall

- Nil

Suggestion for further improvement

- Nil

ICAR-CCARI, Goa

Accomplishments and achievements

- Three batches of parents were reared
- Distributed 39,893 chicks to the farmers and generated Rs. 7.54 lakhs revenue

Short fall

- Target supply not achieved

Suggestion for further improvement

- Efforts should be made to meet the target supply

ICAR-CIARI, Port Blair

Accomplishments and achievements

- Two batches of parents were reared
- Distributed 16,709 improved germplasm to the farmers
- Generated Rs. 1.66 lakhs revenue

Short fall

- Target supply not achieved
- Very poor performance in egg production and hatchability

Suggestion for further improvement

- Efforts should be made to achieve the target supply
- Egg production and hatchability to be improved with better management

SKUAST, Srinagar

Accomplishments and achievements

- Two batches of parents were reared
- Distributed 18,605 chicks to the farmers.

- Generated Rs.4.03 lakhs revenue

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

- Efforts should be made to achieve target supply
- Biosecurity measures to be rigorous at the centre and disease occurrence must be minimized

ICAR-RC for NEH Region, Umiam, Meghalaya

Accomplishments and achievements

- Two batches of parents were reared
- Distributed 12,606 improved germplasm to the farmers
- Generated Rs. 10.27 lakhs revenue

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

- Efforts should be made to meet the target set for germplasm supply

PVNRTVU, Warangal

Accomplishments and achievements

- Three batches of *Vanaraja*, *Gramapriya* and *Vanasree* were reared
- Distributed 40,464 chicks to farmers
- Revenue was Rs. 5.82 lakhs

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

- Efforts should be made to meet the target set for germplasm supply

SVVU, Tirupati

Accomplishments and achievements

- One batch of *Vanaraja* parent was reared
- Distributed 32290 chicks to farmers
- Generated Rs. 4.06 lakhs revenue

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

- Efforts should be made to meet the target set for germplasm supply



Success Stories

AICRP on Poultry Breeding and Poultry Seed Project



Success story of Sanju Vadakkath from Kerala

It has been evident that enormous demand for desi chicken in Kerala for improving backyard production has given a boosting in hatchery sector also. As a success story from AICRP, poultry, Mannuthy, the achievement gained by Sri Sanju, is to be highly appreciated and worthy to be presented.

As a beneficiary of this center, he collects hatching eggs of native chicken on a regular basis. He has taken a franchisee of a hatchery in a nearby area and he hatches the chicks there. Since a huge sector of poultry farming community is interested in rearing desi chicken in view of its better adaptability and scavenging capabilities, he is continuing with this business for the last three years. Since he sells premium quality chicks, his margin is assured. The chicks are proved to be excellent in the field conditions in terms of production performance.

He gets continuous consultancy from our center and he is of the opinion that fertility and hatchability of our stock is optimum and that is the main factor for making his business profitable. He purchases 500- 1000 number of hatching eggs from our center every week based on availability and sells the chicks to poultry farmers of Trissur district and neighbouring districts of Trissur, like Palakkad and Malappuram. He collected hatching eggs from October 2019 onwards and an average hatchability of 85% is obtained on every hatch. He is getting customers

even from outside Kerala state. His credibility is playing a vital role in making his business a continuous success. He could sustain this success pattern even in the worst times of Kerala, ie, in the heavy floods of 2018, 2019, and in the Avian Influenza outbreak that caused a serious threat to the poultry sector during last year.

Success story of a farmer from Tamil Nadu

Mr. S. Raju (Mobile: 09498163635), aged 37 residing at Meppalam village of Tiruvarur District in Tamil Nadu is a small farmer and he rears *Gramapriya* and *Vanaraja* for subsidiary income generation. He learned about production potential of *Vanaraja* and *Gramapriya* and supply of the germplasm from College of Poultry Production and Management, Hosur under ICAR – Poultry Seed Project. He underwent formal two day training on “Desi chicken rearing” in Farmer Training Centre of Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) located at Tiruvarur, in which he learned about scientific management of *desi* chicken.

The farmer reared the chicks under Intensive system, up to 60 days after which he rears the chicks under backyard system. He sells the male birds for meat purpose at the rate of Rs. 180 per kg live weight and keeps the layer chicken for egg production. The eggs are being sold at the rate of Rs. 10.00 per eggs. The farmer got subsidiary income of Rs. 20000 per batch. He regularly purchases 60 to 90 number of *Vanaraja* and *Gramapriya* chicks from PSP Centre, CPPM, Hosur through FTC, Tiruvarur, once in two months. The farmer profoundly thanked ICAR-Poultry Seed Project and TANUVAS for the seed supply and supply of technical know-how to him.

Mr. S. Raju and the farm Success story of Small Poultry farmers in Bihar

Sri Ranjay Paswan of Village Alauli, Khagaria, purchased 800 one wk old *Vanaraja* Chicks from PSP, Patna in the month of April-2019 after seeing the success of first &



second batch which he reared in April-2018 & Sept-2018. The production cost was calculated as under:

Sl. No.	Particulars	Amount
A Investment		
	Cost of chicks 800 pc X @ 25/-	20,000=00
	Transportation charge	2000=00
	Cost of pre-starter feed 50 Kg X 3 bag	3500=00
	Cost of Broken rice, crushed maize, etc	2500=00
	Cost of medicines and other inputs	1000=00
	Miscellaneous cost	2000=00
	Total Investment	31,000=00
B Profit		
	By sell of 772 birds X @ 75	57,900=00
	Net profit B-A	26,900/-

Thus, he got net profit of Rs. 26,900 within 2 months. Further by seeing its economic benefits he became enthusiastic and purchased 1500 birds from Patna centre in the month August-2019 and in this batch he again followed the same line and got net profit of Rs. 45600 within three months.

Nowadays a total of 20 persons from that area are rearing *Vanaraja* birds and getting handsome profit.

Cluster of 40 farm families of village Ujhilpur, E. Champarn got *Vanaraja* birds of three weeks age under farmers FIRST, project of ICAR, in May-2019. Earlier 15 farmers reared native birds having low output. They got off campus training on backyard poultry farming and use of locally available materials for feeding the birds. The birds were regularly monitored by PSP Patna centre and cost profit data were recorded on regular interval. The cluster showed eggs and male birds on Maturity. They are still getting eggs. 6family of them again purchased the second lot of 200 birds each in the month of Jan-2020 at their own cost and rearing it under the technical guidance of Patna centre. The information collected from the cluster is as follows:

Sl. No.	Particulars	Income
1	Number of families benefited	40 families in a cluster under Farmers First Project
2	Number of chicks given @ 30 chicks per family i.e. a total of 30X40 = 1200 chicks	
3	Other input given by FF project, 1 feeder + 1 drinker + 25 Kg pre-starter per family	
4	Number of chicks survived after six month, 1078 (384 M and 664 F)	
5	Average weight at laying M – 2.452 Kg F – 1.850 Kg	
6	Expense on local feeds and medicines etc.	26,000
7	Income by sale of Male birds	1,19,730 (@130 per Kg)
8	Monthly egg production and profit	
	November : 1708 X @7	11956
	December : 6349 X @ 7	44443
	January : 8235 X@ 7	57645
	February : 8342 X @ 7	58394
	March : 8395 X @ 7	58765
	Total	2,31,203
9	7 + 8 = Total Income	3,50,933
10	Net income : 9 - 6 =	3,24,933
11	Average profit per family in 5 months	8,123
12	Average profit per family per month	1625

Mr. Rajnish Kumar of Nalanda, was earlier an unemployed youth. After getting training from BVC, Patna he purchased 400 Vanaraja birds and reared it in free ranging condition. He made a night shelter of Bamboo and clay in Rs. 4000, with the help of centre. His birds started laying in November, 2018. He is selling eggs with a small stall in local market of Nalanda & Patna in daily evening hours. He also uses few eggs for his family. As per his statement he earns Rs. 250 - 300 Daily by selling eggs. He is satisfied with his earnings.



Success story of Small poultry farmers in Manipur

Ramsomngam Muivah (43 years) a farmer from Murei village Ukhurul. He is a dedicated and sincere poultry farmer whose family depends on income generated from rearing poultry. He reared some 200 number of *Gramapriya* birds supplied from ICAR Poultry seed project, Manipur centre in the backyard as a source of income for household maintenance. He has attended training programme conducted by ICAR Manipur Centre and gain technical knowledge about rearing and management of poultry. Now he is happy with the income received from rearing poultry and able to feed and sent his children to school.

1	Name & Age	Mr. Ramsomngam Muivah (43 years)
2	Address	Murei village, Ukhurul District, Manipur
3	Input to the Farmers	200 numbers of <i>Gramapriya</i> chicks
4	Rearing system	Deep litter system
5	Cost of Commercial feeds for 150 layers till 72 wks	30 bags x Rs .1950=Rs. 58,500.00
6	Cost of Rice bran for 100 layers till 72 wks	500kg X Rs 15/kg = Rs. 7,500.00
7	Sale of excess male birds @ 220/kg	37 birds X 3.0kg , 111kg x Rs. 220 = Rs24,420.00
8	Sale of litter @ Rs.5/kg	180kg x Rs.5 =Rs.900
9	Sale of Eggs @ Rs.10/egg	Rs.10 X 48 eggs =Rs. 480
10	Daily income from sale of eggs	Rs. 480
11	Income from eggs for 50 wks	350xRs 480 = Rs 1,68,000.00
12	Net Profit Annual	Rs. 1,27,320.00
13	Average monthly income	Rs 10,610/-



Success story of Ngahnem Khongsa

1	Name & Age	Ms. Ngahnem Khongesai (58 yrs)
2	Address	Kangchup, Imphal west District Manipur
3	Input to the Farmers	200 numbers of <i>Vanaraja</i> chicks
4	Rearing system	Deep litter system
5	Cost of feeds for 150 birds till 72 wks	60 bags x Rs .1950=Rs. 1,17,000.00
6	Sale of excess male birds @ 200/kg	30 birds X 3.0 kg =90kg x Rs. 200=18,000.00
7	Sale of Bokashi Compost @ Rs.5/kg	300kg x Rs.5=Rs.1500.00
8	Sale of Eggs @ Rs.10/egg	Rs.10 X 15 eggs = Rs. 150
9	Daily income from sale of eggs/day	Rs. 150.00
10	Income from eggs for 50 wks	350xRs 150 = Rs 52,500.00
11	Sell of Day Old chicks @ Rs. 40	40 x 4200 = Rs 1,68,000.00
12	Net Profit Annual	1,23,000/-
13	Average monthly income	Rs 10,250/-



Success Story of Mr Lunkhomang Haokip (23 years)

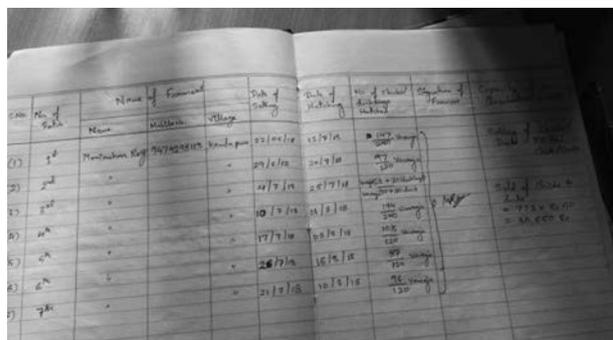
1	Name & Age	Mr. Lunkhomang Haokip (23 years)
2	Address	Samukom Village, Chandel District, Manipur
3	Input to the Farmers	Construction of low cost housing system and 250 numbers of <i>Vanaraja</i> chicks
4	Rearing system	Deep litter system
5	Cost of feeds for 220 Birds till 72 wks	80 bags @ Rs.1950/bag
6	Sale of excess male birds @ 200/kg	30 birds and average 3 kg per male bird
7	Sale of Eggs@Rs.10/egg	10-15 eggs per day sold as table egg and remaining eggs were kept for incubation.
8	Daily income from sale of table eggs	Rs. 100.00
9	Income from eggs for 50 wks	350 x Rs 100
10	Sell of Day Old chicks @ Rs. 40	40 X 6000
11	Net Profit Annual	Rs. 1,37,000/-
12	Average monthly income	Rs 11,400/-

Success stories of poultry farmer at Andaman and Nicobar

A total of three entrepreneurs in N&M Andaman are regularly hatching *Vanaraja* chicks using mini incubator. A total of eight batches of *Vanaraja* eggs were hatched out during the period from April to December 2019. The mean hatchability per cent was 49.66% based on total eggs set. The handling skill of farmers on mini incubator has improved which is justified by improvement in hatchability per cent of 17.53 as compared to last year.

Impact of *Vanaraja* poultry farming using mini incubator

	Before mini incubator	After mini incubator	Increase in chicks availability
Unit size of farm	420	1186	2.82
source of chicks	Govt. poultry farm (Rs. 40/chick)	own	
Hatchability	Nil	64%	



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

13-14 September, 2019 at CPPM, TANUVAS, Hosur (Tamil Nadu)

Inaugural Session

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

Co-Chairman : Dr. R. S. Gandhi, ADG (AP&B), ICAR, New Delhi
Dr. R. N. Chatterjee, Director, ICAR-DPR, Hyderabad
Dr. P. Tensingh Gnanaraj, Registrar, TANUVAS

The Annual Review Meeting of AICRP on Poultry Breeding and Poultry Seed Project was organized by College of Poultry Production and Management (CPPM, TANUVAS) at Hosur on 13 and 14 September 2019. The Inaugural session was chaired by Dr. R. S. Gandhi, ADG (AP&B), ICAR, New Delhi and Dr. R. N. Chatterjee, Director, ICAR-DPR, Hyderabad. Dr. K. Mani, Dean, CPPM, Hosur welcomed all the dignitaries and principal investigators of different units. Dr. R. N. Chatterjee, Director, ICAR-DPR, Hyderabad during his address, welcomed the dignitaries and centre incharges and gave a brief overview of the present status and future projection of rural poultry production in the country. He highlighted the significant achievements and contributions of the AICRP on Poultry Breeding and Poultry Seed Project and highlighted that five location specific rural chicken varieties were developed and two native breeds were registered during last seven years. Dr. Chatterjee complemented the progress made by different centres and informed that targets will be revised accordingly.

Dr. R. S. Gandhi, ADG (AP&B) narrated the importance of rural poultry production and gap between demand and supply of poultry meat and egg in the inaugural address. Dr. Gandhi informed that it is proposed to merge the Poultry seed project with AICRP on Poultry Breeding during next plan. Dr. Gandhi also suggested to involve entrepreneurs in rearing of parents to produce the improved germplasm in a large scale for meeting the demand.

Dr. J.K. Jena, DDG (FS & AS), joined the meeting on the second day, welcomed the delegates on behalf of Council. Dr. Jena advised to compile the significant achievements made during 50 years of AICRP and to celebrate the completion of 50 years at national level. He also instructed to prepare long term vision (2024 and 2030) and to incorporate in the EFC document. Dr. Jena suggested the centres incharges of AICRP centre not to fill the vacant positions and informed that the centres willing to reduce manpower will be provided with enhanced budget provision under recurring contingency head to hire and engage technically qualified manpower on contractual basis. Dr. Jena stressed that to meet the demand of superior germplasm; there is urgent need to involve State AH departments, KVKs and private entrepreneurs into parent rearing and multiplication.

Dr.P.Tensingh Gnanaraj, Registrar, TANUVAS, who joined the meeting along with DDG on the second day, suggested the investigators to undertake research work in low cost shelter for backyard rural poultry for effective protection and enhanced production. Dr.P.Shamsudeen, Professor and Head, Department of Poultry Management, CPPM and incharge of seed centre proposed the vote of thanks.

Technical Session- I

Presentation of PC Report

Dr. U. Rajkumar, incharge, ACIRP-PB presented the PC Report of AICRP on Poultry Breeding for the year 2018-19 and action taken report on the recommendations of last annual review meeting. Dr.Rajkumar informed that most of the recommendations were implemented, but few centres not yet completed the impact assessment study and requested them to complete the task as early as possible. He appreciated the performance of Mannuthy, Bengaluru and Ludhiana centres for achieving the targets. He commented that germplasm supply by Bhubaneswar, Guwahati, Ranchi, Agartala, CARI and Anand centres is poor and need immediate attention to improve the same.

Dr. S. V. Rama Rao, Incharge, PSP presented the PC Report of PSP for the year 2018-19. He appreciated the performance of Hosur, Kolkata, Manipur, Nagaland, Sikkim and Patna centres for achieving the targets of germplasm supply. He commented that germplasm supply by Goa, Port Blair and Srinagar centres is poor and need immediate attention. Dr. Rama Rao informed that most of the recommendations were implemented, but few centres have not yet completed the feedback and impact assessment.

Dr. R. N. Chatterjee stated that Agartala centre needs to speed up efforts to release location specific variety after proper field evaluation. He also stated that best performing centres will be awarded with letter of appreciation. Dr. Chatterjee observed that layer lines of Mannuthy (IWN & IWP) performed well in Anand centre and instructed the centres to study the egg production performance of the terminal cross at farmer level.

Dr. R. S. Gandhi advised the PIs to return the ICAR share of revenue generated under AICRP. He also promised that guidelines regarding utilization of revenue generation under PSP will be provided. He also directed the PIs to submit the Audit Utilization Certificate before September, 2019. Dr. Chatterjee informed that technical program will be reoriented towards conservation and improvement of native breeds, development of location specific varieties and propagation of native and improved germplasm.

ACIRP Centres

Bengaluru

Dr. C. S. Nagaraja, Incharge of the Centre presented the performance of Bengaluru centre. He reported that, Centre completed the purification of native germplasm and performance evaluation of third generation is in progress. Dr. Gandhi suggested to characterize the native population, develop breed descriptor and to take initiative for registration. Dr. Nagaraja presented that positive genetic and phenotypic response observed in primary trait (body weight at 5 weeks) in PB-1 and PB2 lines, but negative response in egg production up to 40 weeks. Dr. Rajkumar suggested initiation of family selection for egg production as there was no selection practiced in female line. Dr. Nagaraja presented the performance of different crosses. Dr. Chatterjee suggested to evaluate the performance of different crosses in the farm and field for selecting a suitable cross combination.

Ludhiana

Dr. S. K. Dash, Incharge of the centre presented the achievements of Ludhiana centre. He informed that evaluation of native *Punjab Brown* initiated. Dr. R.N.Chatterjee suggested purifying the *Punjab Brown* population and making it uniform. Dr. R. S. Gandhi directed the PI to submit the success story in the proper format for publication and also suggested to evaluate the crosses in field with complete economics.

Izatnagar

Dr. V.K. Saxena, Incharge of the centre presented the progress of CARI, Izatnagar centre. Performance of

CSML and CSFL lines are almost reaching a plateau. Dr. R.N.Chatterjee suggested to introduce variability in the population. Dr. R.S.Gandhi advised to make the native chick population uniform and explore the possibility for characterization and registration.

Bhubaneswar

Dr. N. C. Behura, Incharge of the centre presented the progress of the Bhubaneswar centre. He informed that performance of *Hansli* chicken population has been evaluated. Dr. Chatterjee observed that performance CSFL and CSML lines are static and needs improvement and also suggested to improve the germplasm supply. Dr. R. S. Gandhi suggested to incorporate a breeder in the project to implement effective selection and proper data analysis of breeding data and directed the coordinating cell to write a letter to Vice Chancellor, OUAT in this regard.

Mannuthy

Dr. Suja, C.S, Co-PI of the centre presented the achievements of the Mannuthy centre. Dr. Chatterjee suggested undertaking field trial of IWN x IWP cross upto 72 weeks, as this cross is having potential to produce more than 320 eggs. He advised the PI to undertake purification of local native population. Dr. Gandhi appreciated the performance of the centre and directed to evaluate the performance of three-way cross in farmer's field.

Anand

Dr. F. P. Savaliya, PI of the centre presented the progress of the Anand Centre. Dr. Chatterjee suggested strengthening the population of Ankleshwar chicken and purifying the population and making it uniform. Dr. Gandhi directed the centre only to promote the native chicken. He directed the PI to maintain layer pure lines under conservation mode and also suggested to undertake field trail on IWN x IWP cross. Dr. Chatterjee suggested to improve the germplasm supply.

Agartala

Dr. Vinay Singh, Incharge of the Centre presented the progress of Agartala centre. He presented the farm and field performance of three way cross. Dr. Chatterjee suggested that variety development needs to be hastened and directed to PI to submit the detailed field performance report of three-way cross with economic analysis. Dr. R.S. Gandhi suggested to check the performance of cross over generations and present comparative evaluations of successive generations.

Jabalpur

Dr. J. K. Bharadwaj, incharge of the centre presented the achievements made by Jabalpur centre. Dr. Chatterjee suggested to concentrate on Kadaknath and to maintain larger population for selective breeding. Dr. R.S. Gandhi suggested to develop more entrepreneurs for propagation of *Narmadanidhi*. Dr. Chatterjee suggested to replace the M1 and M2 population from DPR and also suggested to improve the germplasm supply. Dr. Gandhi suggested to submit the detailed impact assessment of *Narmadanidhi*. Dr. Jena, DDG(AS) directed the PI to prepare a document on strategy for improving Kadaknath for the period of next 5 years

Udaipur

Dr. S. K. Misra, Incharge of the centre presented the progress of Udaipur centre. Dr.Chatterjee suggested to maintain native *Mewari* population in large numbers for further improvement by selective Breeding. Dr. Gandhi suggested entrepreneurship development for propagation of Pratapdhan. Dr.Chatterjee suggested to report the performance of lines maintained by the centre in the annual report and to improve germplasm supply. Dr. Chatterjee suggested to submit the detailed impact assessment of Pratapdhan.

Palampur

Dr. Varun Sankyan, Co-PI presented the progress of Palampur centre. Dr. Chatterjee suggested to maintain native population in large numbers for further purification and also to identify entrepreneurs for effective propagation of *Himsamridhi*. Dr. Gandhi suggested to take proper biosecurity measures to control the mortality. Germplasm supply also needs improvement. Dr. Chatterjee suggested to submit the detailed success story with economic analysis and impact assessment of *Himsamridhi*.

Guwahati

Dr. N. Kalita, Incharge of the centre presented the progress made by Guwahati centre. Dr.Chatterjee directed the centre to initiate evaluation of native chicken population preferably Daothigir or any other native breed of that locality. Dr. R.S. Gandhi suggested to check the performance of *Kamrupa* over generations and present comparative evaluations of successive generations. Dr. Chatterjee suggested to submit the detailed success story with economic analysis and impact assessment of *Kamrupa*.

Ranchi

Dr. Sushil Prasad, Incharge of the centre presented the progress of Ranchi Centre. Dr. Chatterjee observed that production performance of most of the pure lines were low and mortality was high and suggested to take immediate measures to improve the overall performance by effective management. He also directed to depute the Co-PI/farm manager for training at DPR, Hyderabad. Dr.Gandhi suggested to submit the details of entrepreneur development and low cost incubator. Dr. Gandhi suggested to increase the germplasm supply through linking with KVKs, AH Department, NGOs and entrepreneurs for effective supply of Jharsim. Dr. Gandhi suggested to submit the detailed impact assessment of Jharsim.

Technical Session II

Poultry Seed Project

Sikkim

Dr. Rafiqul Islam, Co-PI presented the progress made by the centre and informed that a total of 89495 improved chicken germplasm was distributed during last year covering 3371 farmers. Dr. Jena appreciated the performance of the centre and revised the target to

supply of 80,000. He also suggested reducing the cost of the day old chick so that it would be more affordable by farmers. Dr.Chatterjee suggested to develop one model village with *Vanaraja* germplasm. Dr. Gandhi directed the PI to undertake detailed feedback and impact assessment study. Dr. Jena observed that Dr. R. Islam, Co-PI is the only person specialized in animal science and suggested to make him as PI of the seed centre.

Nagaland

Dr. Mahek Singh, PI presented the progress of Nagaland Centre. Dr. Chatterjee appreciated the efforts made by the centre in germplasm supply in spite of several constraints. DDG(AS) suggested to retain the target of 70,000 keeping in view of infrastructure facilities. Dr.Gandhi suggested identifying entrepreneurs to meet the higher demand for improved chicken germplasm. Dr. Chatterjee suggested undertaking detailed feedback and impact assessment study.

Manipur

Dr. C. Sonia, Scientist presented the progress of the centre. This centre achieved the target of germplasm supply. Dr. Chatterjee suggested to report the detailed production performance in the field conditions and feedback of the farmers. Dr. Gandhi suggested to maintain strict bio security measures to prevent the mortality in the farm and also suggested to provide details of the entrepreneurship developed.

Barapani

Dr. S. K. Doley, PI, presented the progress of the centre. He informed that infrastructure development is in progress. Dr. Chatterjee stressed to make efforts to achieve the target of germplasm supply of 50,000. Dr. Gandhi suggested to collect native birds and to evaluate the performance.

Hosur

Dr. S. Shamsuddin, presented the progress of the centre. He informed that there is high demand for *Gramapriya* in Tamil Nadu. The centre has achieved the target supply. Dr.Jena suggested to incorporate native breed improvement component at this centre in the EFC. Dr. Chatterjee appreciated the efforts made by the centre in collecting feedback and impact.

Kolkata

Dr. S. Pan Professor presented the progress of the centre. He presented the field performance of *Vanaraja* in field conditions. Dr. Chatterjee suggested indentifying more entrepreneurs/NGOs to enhance the supply of germplasm. Dr. Jena suggested to provide the details of field performance of backyard poultry management as mixed farming with dairy.

Warangal

Dr.Hanumantha Rao, Co-PI presented the report of the centre. He informed that the centre initiated the parent rearing in the existing facility and infrastructure development is in progress. Dr. Jena suggested to make efforts to complete the civil works.

Patna

Dr. Pankaj Kumar, Incharge of the centre presented the progress made by the centre. Dr. Chatterjee advised to collect detailed feedback from farmers along with impact study. Dr. Gandhi suggested to improve germplasm supply.

Portblair

Dr. T. Sujatha, Scientist presented the progress of the centre. Dr. Gandhi suggested improving the performance and germplasm supply. Dr. Chatterjee suggested to involve KVK, entrepreneurs in the supply of germplasm and to obtain farmers feedback. Dr. Gandhi directed the PC and Incharge to visit the centre and submit a report. He also advised to centre to take help from health scientist of the institute.

Goa

Dr. Nibedita Nayak, incharge of the centre presented the progress report. Dr. Chatterjee suggested to improve the germplasm supply. Dr. Gandhi directed the PC and Incharge to visit the centre and submit a report. He also advised to centre to take help from health scientist of the institute.

Srinagar

Dr. M. T. Banday, Professor, presented the progress of the centre. Dr. Chatterjee suggested to improve the germplasm supply. Dr. Gandhi advised the centre to discourage hatching of *Vanaraja* eggs in the field. Dr. Chatterjee suggested to collect feedback from farmers along with impact analysis.

Tirupati

Dr. S. Shakila, Professor presented the progress of the centre. She informed that centre initiated the parent rearing in the existing facility and infrastructure development is in progress. Dr. Chatterjee suggested to speed up the civil works.

Dr. U. Rajkumar, Incharge, AICRP, DPR presented the technical program and action plan for the next year. The exiting technical program will be continued with slight modification proposed in this review meeting. Format for MoU for commercialization of technology will be communicated with the approval of the Council for implementation. Entrepreneurship development will be one of the primary focus of the program. Purification of native chicken should be done before utilization in crosses. All the centres will be involved in improvement of indigenous recognized breeds / identification, characterization and registration of native chicken. Anand centre will work on Ankaleswar breed improvement exclusively.

Plenary Session

Dr. Chatterjee, suggested the PIs for entrepreneurship development for enhancing the supply.

He informed that PSP centres will be merged with AICRP in the proposed EFC. He also informed that all the AICRP centres will be involved in improvement of indigenous recognized breeds/ identification, characterization and registration of native chicken. He reiterated that purification

of native chicken need to be done before utilization in crosses.

Dr. Gandhi suggested that socio economic analysis and impact analysis is mandatory for five AICRP centres developed improved varieties and all seed centres. He directed all the PIs to submit the success stories along with video clips at regular interval. He also directed the PIs to submit the database to coordinating cell.

Dr. J.K. Jena, DDG (FS &AS) informed that PSP centres will be merged with AICRP on Poultry Breeding after 1st March 2020 and also suggested to incorporate new centres which are having potential for improvement of native breeds or for propagation of improved varieties. Dr. Jena informed that there may be a reduction in manpower allocated to AICRP centres during next plan EFC and directed the PIs not to fill the present vacant positions. He directed the coordinating cell to inform the university authorities accordingly.

Dr. J.K. Jena directed the coordinating cell to publish a booklet on 50 years achievement of AICRP. He also advised to publish a booklet on breeds maintained and varieties developed under AICRP and DPR as ICAR publication. Dr. Jena directed to provide letter of appreciation to the best performing centres during this year also. He also informed that non performing centres will be discontinued.

Dr. Jena suggested further improving and fine tuning the terms and conditions of MoU being developed for entrepreneurship development for rearing of parent lines for producing the crosses in large scale. Dr. Chatterjee submitted that registration of parent pure lines needs to be done before commercialization and requested the DDG to advise the nodal agency, NBAGR to expedite the registration process. Dr. Jena suggested to explore the need and possibility for importing superior poultry germplasm for improving the variability and production performance of pure lines maintained by DPR and different centres. He also suggested to submit the detailed proposal to Council for importing germplasm, if required.

Dr. P. Tensingh Gnanaraj, Registrar, TANUVAS proposed the formal vote of thanks.

Recommendations

1. The AICRP on Poultry Breeding and Poultry Seed project is proposed to be merged to one project and instructed to prepare EFC proposal accordingly. The objectives will be revised towards the conservation and improvement of native germplasm, development of location specific variety and propagation of native and improved chicken germplasm.
2. All the centres should start the process of entrepreneurship development for enhancing the supply.
3. In all the AICRP centres the PIs should be from breeding background, if not one Co-PI should be from breeding background for effective implementation of technical programme and data analysis.
4. All the PIs should get farmer's feedback and come out with detailed impact analysis study
5. All the PIs should provide success stories, output and outcome details in the annual report.
6. All AICRP and PSP centres should acknowledge

the AICPR on Poultry Breeding/PSP & ICAR in the publications, thesis, reports etc. All should submit a copy of publication to PC cell.

7. Guidelines of TSP and SCSP should be strictly followed and only tribal beneficiaries under TSP scheme and SC beneficiaries under SCSP scheme

should be included and records of beneficiaries to be maintained.

8. All the Centres should make efforts to increase the germplasm supply.
9. All the Centres should maintain the database of beneficiaries along with their feedback.

**Action Taken Report on the recommendations of AICRP and PSP annual review meeting
13-14 September, 2019 at CPPM, TANUVAS, Hosur (Tamil Nadu)**

SI No	Recommendations	
	General	Action Taken
1	The AICRP on Poultry Breeding and Poultry Seed project is proposed to be merged to one project and instructed to prepare EFC proposal accordingly. The objectives will be revised towards the conservation and improvement of native germplasm, development of location specific variety and propagation of native and improved chicken germplasm.	AICRP and PSP stands merged from 2021-22 onwards and EFC is being prepared accordingly
2	All the centres should start the process of entrepreneurship development for enhancing the supply	Informed to the Centres, Some centres already developed small scale entrepreneurs
3	In all the AICRP centres the PIs should be from breeding background, if not one Co-PI should be from breeding background for effective implementation of technical programme and data analysis.	Complied with, a letter has been written to VCs where breeder is not posted to post breeder
4	All the PIs should get farmer's feedback and come out with detailed impact analysis study	Complied with
5	All the PIs should provide success stories, output and outcome details in the annual report	Complied with. Some centers provided the details
6	All AICRP and PSP centres should acknowledge the AICPR on Poultry Breeding/PSP & ICAR in the publications, thesis, reports etc. All should submit a copy of publication to PC cell.	Complied with
7	Guidelines of TSP and SCSP should be strictly followed and only tribal beneficiaries under TSP scheme and SC beneficiaries under SCSP scheme should be included and records of beneficiaries to be maintained.	Complied with
8	All the Centres should make efforts to increase the germplasm supply	Some centres need improvement
9	All the Centres should maintain the database of beneficiaries along with their feedback	Complied with, all centres are maintaining the database of farmers



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IWP female at Anand centre



IWP male at Anand centre



A pair of IWN birds at Mannuthy centre



Athulya in farmer's field in Kerala



PB-2 Flock at Bengaluru



CSFL breeders at Bhubaneswar



Hans/i birds in the field



Punjab Brown



A pair of Pratapdhan birds



Distribution of birds in Agartala



Himsamridhi birds in a farmer unit at Kangra, Himachal Pradesh



A woman farmer with Himsamridhi birds at Mandi, Himachal Pradesh



Himsamridhi birds under field conditions Himachal Pradesh



Narmadanidhi birds in farmers field



A woman farmer with Narmadanidhi birds



Hon'ble DDG (AS) visiting Ranchi Centre



A woman farmer with *Jharsim* birds



A woman farmer with *Jharsim* birds



Assamese woman with *Kamrupa* birds



Kamrupa birds in field condition



Beneficiaries with day old chicks at Manipur centre



Pratapdhan birds under field condition in Rajasthan



Pratapdhan birds in backyard



Srinidhi birds in a farmer's house at Goa



Women beneficiaries with day old chicks at Kolkata centre



Vanaraja chicks distributed through Kolkata centre



Sikkim woman farmer with eggs from backyard chicken



A woman farmer feeding backyard chicken in Sikkim



Training and distribution of inputs at Meghalaya centre



A woman farmer with rural variety at Manipur



Participants of poultry farming training program at Manipur



Srinidhi parent birds at Meghalaya centre



AICRP & PSP review meeting



Participants of AICRP & PSP review meeting



50
Years of
AICRP



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