AICRP ON POULTRY BREEDING AND POULTRY SEED PROJECT

वार्षिक प्रतिवेदन
Annual Report
2021-22

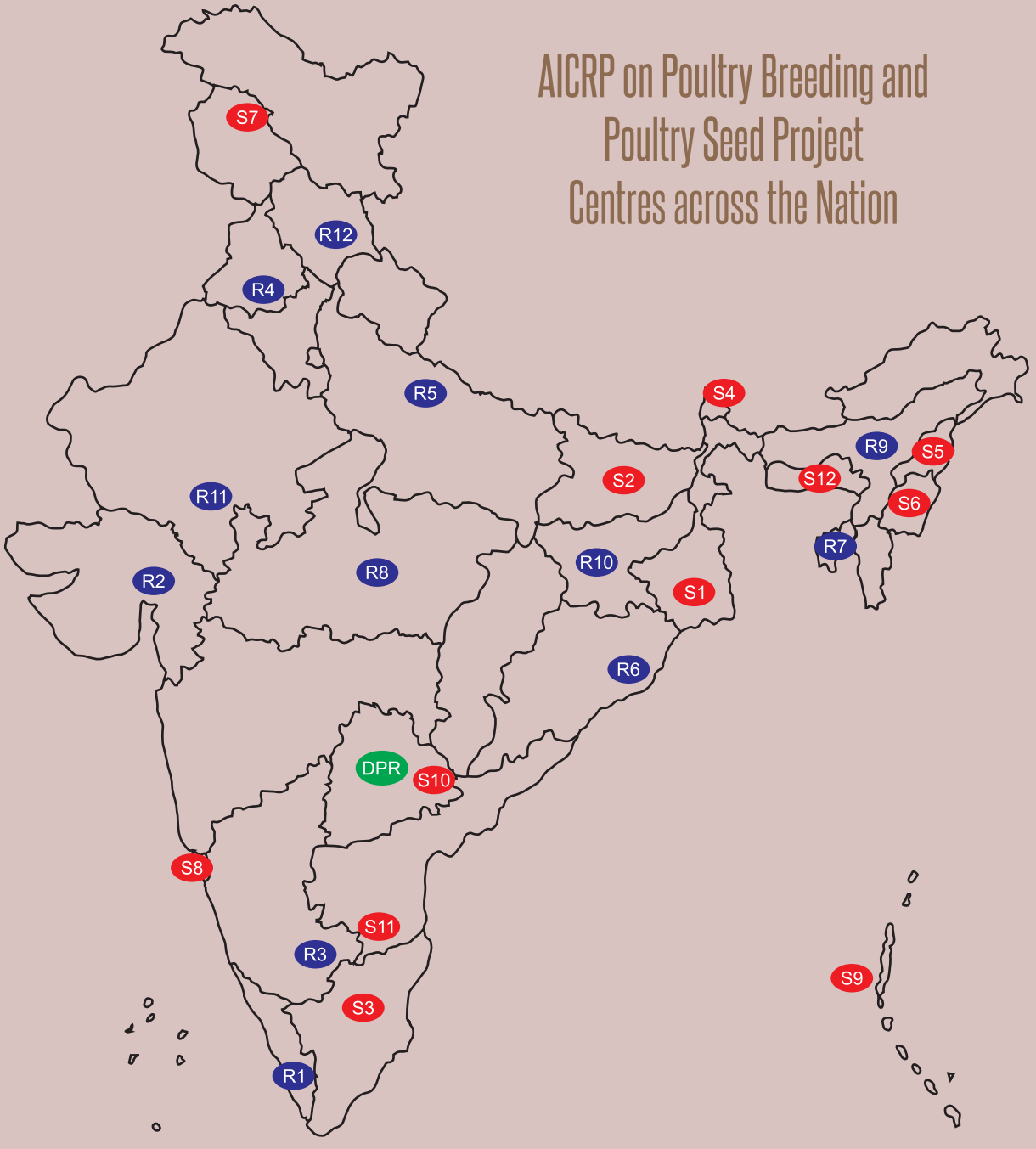
भाकृअनुप- कुक्कुट अनुसंधान निदेशालय

ICAR - Directorate of Poultry Research

Rajendranagar, Hyderabad - 500 030, Telangana, India

ISO 9001:2015

AICRP on Poultry Breeding and Poultry Seed Project Centres across the Nation



ICAR - DPR

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

PSP Centres	
S1	WBUAFS, Kolkata
S2	BASU, Patna
S3	TANUVAS, Hosur
S4	ICARRCNEH, Gangtok
S5	ICARRCNEH, Jharnapani
S6	ICARRCNEH, Imphal
S7	SKUAST, Srinagar
S8	ICAR-CCARI, Goa
S9	ICAR-CIARI, Port Blair
S10	PVNRTVU, Warangal
S11	SVVU, Tirupati
S12	ICAR-RC for NEHR, Barapani

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Front Cover

A pair of *Ankleshwar* birds

Inside Front Cover

Location of AICRP on Poultry Breeding and Poultry Seed Project centres

Back Cover

Azadi Ka Amrit Mahotsav logo and Q.R. code of ICAR-DPR mobile app

Inside Back Cover

ICAR-DPR Building

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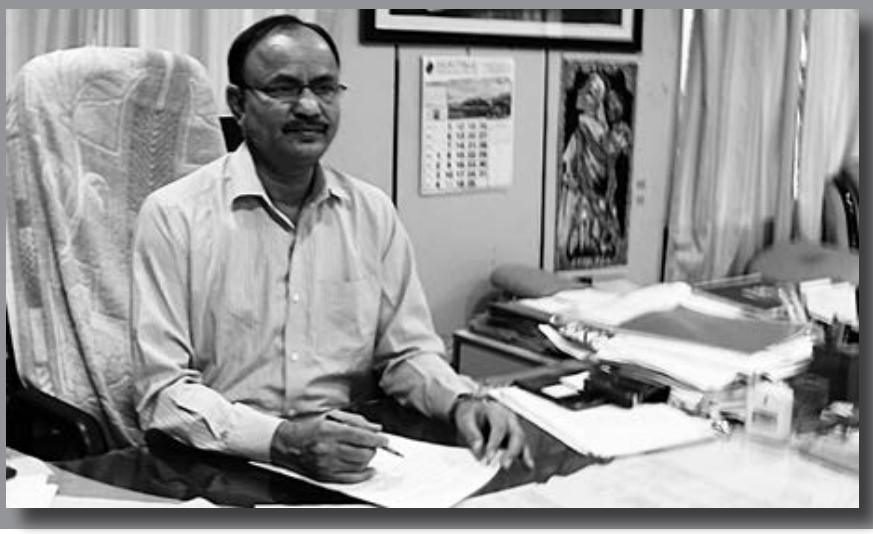


Preface

The ICAR-Directorate of Poultry Research, a premier organization under the aegis of the Indian Council of Agricultural Research mandated to conduct 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 Poultry Seed Project each. It gives me immense pleasure to present the Annual Report of AICRP on Poultry Breeding and Poultry Seed Project for the year 2021-22.

The AICRP on Poultry Breeding is aimed at developing and propagating location specific rural chicken varieties suitable for local conditions in different parts of the country. 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. Recently the major emphasis was given for the work on conservation, characterization of native chicken breeds and their utilization in development of location specific varieties in different centres of the AICRP on Poultry Breeding. Twelve Poultry Seed Project centres spread across the country are in operation to increase the availability of improved germplasm throughout the country and getting the feedback from farmers for further improvement of pure lines. The untiring efforts of all the staff of AICRP on the Poultry Breeding and Poultry Seed Project lead to the effective propagation of backyard poultry in the country.

A total of nine success stories have been documented during the year 2021-22 from different centres of AICRP and PSP. During the year a total of **6.54** 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. **207.16** lakhs revenue was generated by supplying the improved chicken germplasm. A total of about **4.34** lakhs of germplasms were supplied by the poultry seed project centres.

I am extremely grateful to Dr. Trilochan Mohapatra, Secretary, DARE and Director General, ICAR for all the support and encouragement extended for the effective functioning of the AICRP and PSP. I am thankful to Dr. Bhupendra Nath Tripathi, Deputy Director General (Animal Science), for his keen interest and guidance. I am thankful to the Secretary, ICAR and Financial Adviser, ICAR for their continuous support to the Directorate. I am thankful to Dr. V.K. Saxena, ADG (AP&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 centres, who deserves due appreciation. I also thank all other staff for supporting the scientists in their research endeavour. I also thank the editorial committee for bringing out this report in an appreciable manner.

Date: 27-08-2022 (R.N. Chatterjee)

Director

Abbreviations

AFE	Age at first egg
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
FES	Fertile eggs set
Gen.	Generation
HH	Hen housed
HD	Hen day
S	Survivors'
TES	Total eggs set
Wks	Weeks

Contents

1 कार्यकारी सारांश

कुक्कुट प्रजनन पर अखिल भारतीय समन्वित अनुसंधान परियोजना (एआईसीआरपी)

कुक्कुट प्रजनन पर स्थित एआईसीआरपी कुल बारह केंद्रों पर संचालित की जा रही है जो सफलतम परियोजनाओं में से एक है। केवीएएसयू, मन्नुथी; एएयू, आनंद ; केवीएएफएसयू, बेंगलुरु; गडवासु, लुधियाना; ओयूएटी, भुवनेश्वर; भाकृअनुप-सीएआरआई, इज्जतनगर; एनईएच क्षेत्र के लिए भाकृअनुप क्षेत्रीय केंद्र, अगरतला; एनडीवीएसयू, जबलपुर; एएयू, गुवाहाटी; बीएयू, रांची; एमपीयूएटी, उदयपुर; और सीएसकेएचपीकेवीवी, पालमपुर है। परियोजना के मुख्य उद्देश्य स्थान विशिष्ट कुक्कुट किस्मों का विकास, संरक्षण, सुधार, लक्षण वर्णन और स्थानीय देशी, कुलीन लेयर और ब्रायलर जर्मप्लाज्म के अनुप्रयोग के अलावा ग्रामीण, आदिवासी और घर आंगन क्षेत्रों में ग्रामीण कुक्कुट और उद्यमिताओं के प्रथाओं के पैकेज का विकास करना है। केवीएएसयू , मन्नुथी, और एएयू , आनंद केंद्र दो कुलीन लेयर जर्मप्लाज्म (IWN और IWP) को बनाए रखने के लिए हैं। केवीएएफएसयू, बेंगलुरु और जीएडीवीएएसयू , लुधियाना, ओयूएटी, भुवनेश्वर, भाकृअनुप-सीएआरआई, इज्जतनगर में कुल चार (प्रत्येक केंद्र द्वारा दो) कुलीन ब्रॉयलर जर्मप्लाज्म (PB-1, PB-2, CSML और CSFL) बनाए रखे गए हैं।

यादृच्छिक वंशावली नस्ल नियंत्रण जीवों (लेयर के लिए एक और ब्रॉयलर के लिए एक) भाकृअनुप-कुक्कुट अनुसंधान निदेशालय, हैदराबाद में बनाए रखा गया। इन जीवों के सेने वाले अंडों के नमूनों को आनुवंशिक प्रगति मापने हेतु कुक्कुट प्रजनन पर स्थित एआईसीआरपी के विभिन्न केंद्रों में भेजे गए हैं। परिषद द्वारा लिए गए निर्णय के अनुसार विभिन्न एआईसीआरपी केंद्रों और भाकृअनुप-डीपीआर पर अनुरक्षित नस्लों को विभिन्न एआईसीआरपी केंद्रों पर द्विगुणित किया गया, जिसका उपयोग केंद्र द्वारा तीन और चार मार्गीय संकर के उत्पादन हेतु केंद्र द्वारा संसाधन जीवों के रूप में किया जाना था। विभिन्न एआईसीआरपी केंद्रों में द्विगुणित किए जा रहे नस्लों, आनंद में आईडब्ल्यूडी और आईडब्ल्यूके और जबलपुर में एम-1 और एम-2 हैं। वर्ष के दौरान विभिन्न केंद्रों से कुल 6,07,637 कुक्कुट जर्मप्लाज्म किसानों को वितरित किया गया। उन्नत कुक्कुट जर्मप्लाज्म के वितरण और प्रसार के माध्यम से रू.207.16 लाख राजस्व प्राप्त हुआ।

वर्ष 2021-22 में कुक्कुट प्रजनन एआईसीआरपी , मन्नुथी केंद्र , केवीएएसयू ने 40 सप्ताह की आयु तक देशी कुक्कुट जर्मप्लाज्म की एस-6 पीढ़ी का मूल्यांकन किया। 40 सप्ताह की आयु तक अंडे का उत्पादन 75.75 अंडे रहा और 40 सप्ताह की आयु में औसत अंडे का वजन 43.95 ग्राम रहा। पिछली पीढ़ी की तुलना में अंडे के उत्पादन में 3.2 अंडे की कमी हुई, जबकि 28- और 40-सप्ताह में अंडे के वजन में क्रमशः 1.39 और 0.91 ग्राम की वृद्धि हुई। टीईएस और एफईएस (82.80 और 92.75%) पर उर्वरता (89.33%) और हैचबिलिटी अच्छी रही। केंद्र ने 72 सप्ताह की आयु तक व्हाइट लेगॉर्न के आईडब्ल्यूएन और आईडब्ल्यूपी उपभेदों की एस-32 पीढ़ी का भी मूल्यांकन किया। 72 सप्ताह की आयु तक प्रति कुक्कुट दैनिक आधार पर अंडे का उत्पादन आईडब्ल्यूएन में 292.94 और आईडब्ल्यूपी नस्लों में 278.89 रहा। IWN और IWP उपभेदों की S-33 पीढ़ी का 28 सप्ताह की आयु तक मूल्यांकन किया गया। केंद्र ने 15.52 लाख रुपये का राजस्व अर्जित किया और वर्ष के दौरान कुल 30,238 जर्मप्लाज्म की आपूर्ति की है। चालू वर्ष के दौरान केन्द्र से जर्मप्लाज्म आपूर्ति कर 305 किसान लाभान्वित हुए हैं।

चालीस सप्ताह तक की आयु के कुक्कुट की अंकलेश्वर नस्ल की एस-2 पीढ़ी का मूल्यांकन किया गया। चालीस सप्ताह की आयु तक अंकलेश्वर कुक्कुट (एस-2 जीन) का अंडा उत्पादन 81.5 रहा जो एस-1 पीढ़ी (76.4) में दर्ज की तुलना में अधिक रहा। अंकलेश्वर कुक्कुट की एस-3 पीढ़ी का उत्पादन किया गया और इसका मूल्यांकन किया जा रहा है। IWN और IWP उपभेदों की S-2 पीढ़ी का मूल्यांकन 72 सप्ताह की आयु तक किया गया। बहत्तर सप्ताह की आयु तक अंडे का उत्पादन आईडब्ल्यूएन में 303.37 और आईडब्ल्यूपी नस्लों में 301.73 रहा। IWD और IWK उपभेदों की S-9 पीढ़ी का मूल्यांकन 64 सप्ताह की आयु तक किया गया। आईडब्ल्यूके (222.58) की तुलना में आईडब्ल्यूडी (233.95) में 64 सप्ताह की आयु तक अंडे का उत्पादन अधिक रहा। समीक्षाधीन अवधि के दौरान केंद्र ने कुल 70,311 जर्मप्लाज्म की आपूर्ति की है। केंद्र ने वर्ष के दौरान रू. 33.48 लाख राजस्व प्राप्त किया है।

बेंगलुरु केंद्र ने वर्ष के दौरान देशी कुक्कुट, PB-1 और PB-2 वंशावलियों और उनके संकर का मूल्यांकन किया। पीबी-1 और पीबी-2 वंशावलियों में पांच सप्ताह के शरीर का वजन क्रमशः 956.2 और 947.2 ग्राम रहा। PB-1 और PB-2 वंशावलियों में 40 सप्ताह की आयु तक अंडे का उत्पादन क्रमशः 43.6 और 28.4 अंडे रहा। 8, 20 और 40 सप्ताह की आयु में देशी कुक्कुट (S-5) के शरीर का वजन क्रमशः 384.9, 1268 और 1482 ग्राम रहा। 40 सप्ताह की आयु में देशी कुक्कुटों के अंडे का वजन 42.60 ग्राम रहा। PB-1 में 5 सप्ताह के शरीर के वजन की फेनोटाइपिक और आनुवंशिक प्रतिक्रिया क्रमशः 9.74 और 30.68 ग्राम रही और PB-2 में संबंधित मान क्रमशः 5.70 और 19.45 ग्राम रहा। कुल 325 किसानों को 1,66,837 कुक्कुट जर्मप्लाज्म वितरित किया गया। वर्ष के दौरान केंद्र ने रू.46.67 लाख राजस्व प्राप्त किया।

लुधियाना केंद्र ने वर्ष के दौरान पंजाब ब्राउन, पीबी-1 और पीबी-2 वंशावलियों का मूल्यांकन किया। पीबी-1 और पीबी-2 वंशावलियों में पांच सप्ताह का शरीर का वजन क्रमशः 1241 और 1152 ग्राम रहा, जिसका संगत एफसीआर क्रमशः 1.88 और 1.89 रहा। 40 सप्ताह की आयु तक PB-1 और PB-2 वंशावलियों में अंडे का उत्पादन क्रमशः 55.02 और 56.13 रहा। पंजाब ब्राउन में 8 सप्ताह का शरीर का वजन 3.9 ग्राम जिसका एफसीआर 615.9.6 ग्राम रहा। पंजाब ब्राउन में 52 सप्ताह की आयु तक अंडे का उत्पादन 100.3 अंडे रहा। 36 सप्ताह की आयु में अंडे का वजन 50.11 ग्राम रहा। केंद्र ने 444 किसानों को 85,999 जर्मप्लाज्म वितरित किया है। केंद्र ने रू.28.36 लाख राजस्व अर्जित किया।

भाकृअनुप-सीएआरआई केंद्र ने स्थानीय देशी कुक्कुट (S-6) जर्मप्लाज्म का मूल्यांकन किया और 1280 अच्छे चूजों का उत्पादन किया। 16 सप्ताह की आयु में देशी कुक्कुट के शरीर का वजन, स्तन कोण, टांग की लंबाई और खेना की लंबाई क्रमशः 1095 ग्राम, 34.03, 7.68 cm, मादाओं में 9.55 cm और नर में 1468 ग्राम, 37.50, 8.74 cm, 10.23 cm रही। खेत में दोहरे उद्देश्य वाले संकर (F1 x CSFL) में 1, 2, 3, 4, 6 और 20 सप्ताह की आयु में शरीर का वजन क्रमश: 36.62, 157.5, 245.3, 419.9, 643.7, 917.5, 1154 और 2818 ग्राम रहा। सीएसएमएल, सीएसएफएल और कंट्रोल वंशावली के कुल 3163, 3518 और 795 अच्छे चूजों का उत्पादन किया गया। सीएसएमएल, सीएसएफएल और नियंत्रण वंशावलियों में 5 सप्ताह की आयु में शरीर का वजन क्रमशः 1243, 1262 और 838.9 ग्राम रहा। सात राज्यों के 46 किसानों और

अन्य हितधारकों को कुल 46,981 जर्मप्लाज्म (20809 उपजाऊ अंडे, 23,823 एक दिन की आयु के चूजे और 2349 वयस्क कुक्कुट) की आपूर्ति की गई।

भुवनेश्वर केंद्र को हंसली, सीएसएमएल, सीएसएफएल और उनके संकर का मूल्यांकन करने का कार्य सौंपा गया है। हंसली कुक्कुट के S-0 पीढ़ी के कुल 161 अच्छे चूजों को जन्म दिया गया और एक दिन की आयु में शरीर का औसत वजन 30.22 ग्राम रहा। हंसली में 8 और 20 सप्ताह की आयु में शरीर का वजन क्रमशः 449.6 और 1535 ग्राम रहा। केंद्र ने पुन: स्थापित करने के लिए सीएसएमएल और सीएसएफएल वंशावलियों के हैचिंग अंडे खरीदे हैं। वर्ष के दौरान भुवनेश्वर केंद्र की जर्मप्लाज्म आपूर्ति और राजस्व सृजन शून्य रहा ।

त्रिपुरा केंद्र ने वर्ष के दौरान त्रिपुरा ब्लैक, दलहमरेड , ब्रायलर मादा वंशावली और उनके संकर का मूल्यांकन किया। बीएनडी संकर के ई-5 मूल्यांकन में 72 सप्ताह का अंडा उत्पादन फार्म के तहत 166.48 अंडे और 52 सप्ताह तक किसान के खेतों में 91.45 अंडे रहा। बीएनडी संकर का ई-6 मूल्यांकन खेत के तहत 52 सप्ताह तक और खेत की परिस्थितियों में 40 सप्ताह की आयु तक पूरा किया गया। बीएनडी संकर के ई-6 मूल्यांकन के दौरान 40 सप्ताह का अंडा उत्पादन आंगन और खुले क्षेत्र की स्थितियों के तहत क्रमशः 66.16 और 53.22 अंडे दर्ज किया गया। 20 और 40 सप्ताह की आयु में ई-6 में दर्ज शरीर के वजन में खेत के तहत पिछले (ई -5) मूल्यांकन की तुलना में साधारण कमी देखी गई । इस अवधि के दौरान त्रिपुरा के 587 किसानों को कुल 28,561 चूजों की आपूर्ति की गई, जिससे रुपये 12.24 लाख राजस्व की प्राप्ति हुई।

जबलपुर केंद्र ने 20 सप्ताह की आयु के जबलपुर रंगन और कड़कनाथ की जी-1 जीवों का मूल्यांकन किया । 40, 52 और 72 सप्ताह की आयु में कड़कनाथ का शरीर का वजन क्रमशः 1500, 1640 और 1905 ग्राम रहा और संबंधित आयु में जबलपुर रंगन 1940, 2100 और 2710 ग्राम वज़न रही। जबलपुर रंगन कुक्कुट 156 दिन में और कड़कनाथ 169 दिन की आयु में परिपक्वता प्राप्त की है। कड़कनाथ नस्ल के कुक्कुट 40, 52 और 72 सप्ताह की आयु में क्रमश: 63.0, 93.2 और 116.7 अंडे और जबलपुर रंगीन का अंडा उत्पादन क्रमश: 93.3, 161.0 और 247.5 अंडे रहा। जी-2 प्रतिस्थापन जनसंख्या का उत्पादन और मूल्यांकन 6 सप्ताह की आयु तक विकास लक्षणों के लिए किया गया। जेबी कलर और कड़कनाथ का 6 सप्ताह का वजन क्रमश: 705.3 और 399.4 ग्राम रहा। नर्मदानिधि का 8- और 20-सप्ताह के शरीर का वजन क्रमशः नर में 763 और 1373 ग्राम और मादाओं में 629 और 1126 ग्राम जो खुले क्षेत्रों की परिस्थितियों में रहा। नर्मदानिधि के क्षेत्र पालन के तहत 52 सप्ताह तक अंडे का उत्पादन 91.2 अंडे रहा, जिसका औसत अंडे का वजन 47 से 48 ग्राम रहा। यहां 411 किसानों को कुल 51,361 कुक्कुट जर्मप्लाज्म वितरित किया गया, जिससे रु.30.57 लाख राजस्व प्राप्त हुआ।

उदयपुर केंद्र ने वर्ष के दौरान मेवाड़ी , सीएसएफएल, आरआईआर और प्रतापधन जीवों का मूल्यांकन किया। मेवाड़ी मादाओं में 40 सप्ताह की आयु में शरीर का वजन 1743 ग्राम रहा। 52 सप्ताह की आयु तक मेवाड़ी कुक्कुट में अंडे का उत्पादन 52.46 अंडे रहा। प्रतापधन में वार्षिक अंडा उत्पादन (72 सप्ताह की आयु तक) 160.2 रहा। केंद्र ने खेत और खुले क्षेत्रों की स्थितियों के तहत मांस प्रकार के कुक्कुट जर्मप्लाज्म का मूल्यांकन किया । परियोजना के टीएसपी घटक के तहत 206 आदिवासी किसानों को लाभान्वित करते हुए चार प्रशिक्षण कार्यक्रम आयोजित किए गए। चालू वर्ष के दौरान लगभग 353 किसानों को कुल 20,108 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। वर्ष के दौरान केंद्र को रू.5.45 लाख राजस्व प्राप्त हुआ ।

पालमपुर केंद्र ने वर्ष के दौरान देशी कुक्कु जर्मप्लाज्म, दहलेमरेड और हिमसमृद्धि का मूल्यांकन किया । देशी कुक्कुटों की जी-9 पीढ़ी में 40 सप्ताह तक के एचएचईपी और एचडीईपी क्रमशः 46.09 और 47.26 रही। 28 और 40 की आयु में अंडे का वजन क्रमशः 40.85 ± 0.10 और 45.75 ± 0.13 ग्राम रहा। दहलेमरेड में, एचएचईपी और एचडीईपी 40 सप्ताह तक की आयु तक क्रमशः 78.70 और 80.65 रहा। 28 और 40 की आयु में अंडे का वजन क्रमशः 49.01±0.10 और 52.10±0.25g रहा। दहलमरेड x नेटिव कुक्कुट संकर की 40 और 52 सप्ताह की आयु तक का एचएचईपी क्रमशः 66.31 और 106.96 रहा और एचडीईपी 40 और 52 सप्ताह तक क्रमशः 68.04 और 111.6 रहा। हिमसमृद्धि कुक्कुटों के लिए 40 सप्ताह की आयु तक एचएचईपी और एचडीईपी क्रमशः 71.65 और 72.81 रहा। वर्ष के दौरान केंद्र ने दूर-दराज के आदिवासी क्षेत्रों सहित राज्य के विभिन्न क्षेत्रों में किसानों को कुल 70,333 चूजों की आपूर्ति की। केंद्र को चालू वर्ष के दौरान रू.19.52 लाख राजस्व की प्राप्ति हुई।

गुवाहाटी केंद्र ने देशी, दलहमरेड और पीबी -2 शुद्ध वंशावलियों, बीएन और बीएनडी संकर और दाओथिगीर जीवों का 72 सप्ताह तक का मूल्यांकन किया। दाओथिगीर में 20 और 40 सप्ताह की आयु में शरीर का वजन क्रमशः 1161 और 1851 ग्राम रहा और अंडे का वजन और 72 सप्ताह तक अंडे का उत्पादन (रखे गए कुक्कुटों के आधार पर) क्रमशः 36.90 ग्राम और 116.90 अंडे तथा एएसएम 197.1 दिन रहा। पांच सप्ताह के शरीर का वजन देशी में 180.6 ग्राम, पीबी-2 में 1221 ग्राम और दलहमरेड में 440.1 ग्राम रहा । कामरूप किस्म का मूल्यांकन खेत और खुले क्षेत्रों की स्थितियों में 72 सप्ताह की आयु तक किया गया और यौन परिपक्वता की आयु खेत में 148.1 दिन और खुले क्षेत्रों की स्थितियों में 169.1 दिन रही। कुक्कुटों ने 40 सप्ताह, 52 सप्ताह और 72 सप्ताह की आयु तक अंडे का उत्पादन खेत में 51.20, 92.80 और 155.50 अंडे दिए और इसका सह-संबंधित मूल्य क्रमशः 45.30, 75.60 और 124.30 अंडे रहा। केंद्र ने 202 किसानों को कुल 44,077 जर्मप्लाज्म की आपूर्ति कर वर्ष के दौरान रू. 9.09 लाख राजस्व अर्जित किया।

रांची केंद्र ने देशी कुक्कुट, दहलमरेड , पीबी-2 व झारसिम का मूल्यांकन किया। देशज जीवों का प्रति दिन कुक्कुट अंडा उत्पादन 64 सप्ताह की आयु में 102.8 अंडे (G9) रहा। G10 वीं पीढ़ी के दौरान देशी कुक्कुट में 4 और 16 सप्ताह की आयु में शरीर का वजन 28.12, 167.4 और 759.7 ग्राम रहा। मूल्यांकन-9 के दौरान झारसिम में 64 सप्ताह की आयु तक कुक्कुट दैनिक के आधार पर अंडे का उत्पादन 133.23 अंडे रहा। 16 सप्ताह की आयु में झारसिम (ई-10) में 8, 12 और शरीर का वजन क्रमशः 472.1, 946.8 और 1439 ग्राम रहा। केंद्र ने 208 किसानों, गैर सरकारी संगठनों, केवीके और अन्य एजेंसियों के बीच कुल 39,812 जर्मप्लाज्म की आपूर्ति कर रु. 6.26 लाख राजस्व प्राप्ति किया।

वर्ष 2021-22 के दौरान जर्मप्लाज्म आपूर्ति एवं राजस्व सृजन

केंद्र	जर्मप्लाज्म आपूर्ति (सं)	राजस्व सृजन (रु. लाख में)
केवीएएसयू, मन्नुथी	30,238	15.52
एएयू, आनंद	70,311	33.48
केवीएएफएसयू, बेंगलुरु	1,66,837	46.67
गडवासु, लुधियाना	85,999	28.36
ओयूएटी, भुवनेश्वर	0	0
भाकृअनुप-सीएआरआई, इज्जतनगर	46,981	0
एनडीवीएसयू, जबलपुर	51,361	30.57
सीएसकेएचपीकेवीवी, पालमपुर	70,333	19.52
भाकृअनुप-क्षेत्रीय केंद्र, अगरतला	28,561	12.24
एएयू, गुवाहाटी	44,077	9.09
बीएयू, रांची	39,812	6.26
एमपीयूएटी, उदयपुर	20,108	5.45
कुल	**6,54,618**	**207.16**

कुक्कुट बीज परियोजना

कुक्कुट बीज परियोजना (पीएसपी) जो हमारे देश के दूरदराज क्षेत्रों में ग्रामीण कुक्कुट जर्मप्लाज्म की उपलब्धता बढ़ाने के उद्देश्य से विकसित की गई। इस प्रयास में, भारतीय कृषि अनुसंधान परिषद ने ग्यारहवीं पंचवर्षीय योजना के दौरान छह केंद्रों, पूर्वोत्तर क्षेत्र में तीन और विभिन्न राज्य पशु चिकित्सा / कृषि विश्वविद्यालयों में तीन के साथ «कुक्कुट बीज परियोजना» को आरंभ किया। अपने-अपने क्षेत्रों में किसानों की आवश्यकताओं को पूरा करने के लिए पांच और केंद्रों को इसमें जोड़कर बारहवीं योजना के दौरान परियोजना को अधिक मजबूत किया गया। वर्तमान में यह परियोजना देश भर में 12 केंद्रों पर संचालित की जा रही है। इस परियोजना का मुख्य उद्देश्य उन्नत कुक्कुट जर्मप्लाज्म (उपजाऊ अंडे, एक दिन की आयु के चूजों और वयस्क चूजों) का स्थानीय उत्पादन और ग्रामीण कुक्कुट उत्पादन को बढ़ाने के लिए अंडे और मांस के उत्पादन में वृद्धि को लक्षित करने हेतु दूरदराज के क्षेत्रों में विभिन्न हितधारकों को आपूर्ति करना और सामाजिक- लक्षित समूहों की आर्थिक स्थिति एवं छोटे पैमाने के कुक्कुट उत्पादकों को संगठित बाजार से जोड़ना भी है।

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

निदेशालय एक समन्वय इकाई के रूप में, पेरेंट चूजों की आपूर्ति करता है तथा विभिन्न केंद्रों की गतिविधियों का समन्वय और निगरानी करता है ताकि वे प्रत्येक केंद्र के लिए निर्धारित लक्ष्यों को प्राप्त कर सकें। वर्ष 2021-22 के दौरान मुख्य भूमि और उत्तर-पूर्व में स्थित केंद्रों के लिए चूजों की आपूर्ति के लिए निर्धारित लक्ष्य विभिन्न केंद्रों के लिए प्रति वर्ष 0.5 और 1.0 लाख चूजों के बीच रहा और घर-आंगन स्थितियों के तहत जर्मप्लाज्म के प्रदर्शन पर प्रतिक्रिया एकत्र करना था। वर्ष के दौरान कुल 4,34,078 उन्नत कुक्कुट किस्मों को संबंधित क्षेत्रों/ राज्यों में वितरित कर रु.177.45 लाख राजस्व प्राप्त किया गया।

वनराजा पेरेंटों के एक जत्थे को पटना केंद्र में पाला गया। वर्ष 2021-22 के दौरान बिहार में किसानों को कुल 41,544 वाणिज्यिक कुक्कुट जर्मप्लाज्म वितरित किए गए, जिससे रू.20.49 लाख राजस्व प्राप्त हुआ।

झरनापानी केंद्र में वनराजा और श्रीनिधि का एक-एक बैच पाला जा रहा है। वर्ष 2021-22 के दौरान नागालैंड और पड़ोसी राज्यों के किसानों को कुल 59,910 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। झरनापानी केंद्र में पीएसपी के तहत रु.29.39 लाख राजस्व प्राप्त किया गया।

भाकृअनुप, एनओएफआरआई, गंगटोक, सिक्किम में वनराजा पेरेंटों के एक बैच को पाला गया। वनराजा के कुल 70,582 उन्नत कुक्कुट जर्मप्लाज्म को सिक्किम में किसानों को वितरित कर रू.43.85 लाख राजस्व प्राप्त किया। केंद्र ने जर्मप्लाज्म के निर्धारित लक्ष्य को प्राप्त कर लिया है।

वनराजा और श्रीनिधि के पेरेंटों के एक-एक बैच को मणिपुर केंद्र में पाला गया। मणिपुर में किसानों को कुल 17,645 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। केंद्र ने वर्ष 2021-22 के दौरान रु.13.32 लाख राजस्व प्राप्त किया।

इस समयावधि के दौरान होसुर केंद्र में वनराजा के दो और ग्रामप्रिया पेरेंटों के एक बैच को पाला है। तमिलनाडु में लाभार्थियों को कुल 98,649 उन्नत ग्रामीण कुक्कुट (वनराजा और ग्रामप्रिया) जर्मप्लाज्म वितरित किया गया। केंद्र ने वर्ष के दौरान रू.27.99 लाख राजस्व अर्जित किया।

वर्ष के दौरान गोवा में ग्रामप्रिया के एक बैच को पाला गया। कर्नाटक और महाराष्ट्र के किसानों को कुल 31,083 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु. 5.31 लाख राजस्व प्राप्त किया गया।

निकोबारी पेरेंटों के एक बैच को पोर्ट ब्लेयर में डीप लिटर पद्धति के तहत पाला गया। वर्ष के दौरान अंडमान और निकोबार द्वीप समूह के किसानों को कुल 1200 कुक्कुट जर्मप्लाज्म वितरित किया गया।

वनराजा पेरेंटों के एक बैच को एनईएच क्षेत्र, उमियाम के लिए भाकृअनुप क्षेत्रीय केंद्र में पाला गया। मेघालय में किसानों को कुल 10,211 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु. 10.84 लाख राजस्व प्राप्त किया गया।

वनराजा पेरेंटों के दो बैचों को श्रीनगर केंद्र में पाला गया। जम्मू-कश्मीर के किसानों को कुल 18,113 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रू. 6.97 लाख राजस्व प्राप्त किया गया।

एसवीवीयू , तिरुपति, आंध्र प्रदेश में वनराजा पेरेंटों के दो बैच बनाए रखे गए। किसानों को कुल 22,169 चूजों की आपूर्ति की गई और इस अवधि के दौरान चूजों और अंडों के विक्रय से रू.2.39 लाख आय प्राप्त हुई।

इस अवधि के दौरान वनश्री के चार बैचों, ग्रामप्रिया के तीन बैचों , असील के दो बैच और कड़कनाथ और घगस पेरेंटों के एक-एक बैच को पीवीएनआरटीवीयू, वारंगल, तेलंगाना में पाला गया। कुल 62,972 उन्नत ग्रामीण कुक्कुट जर्मप्लाज्म को किसानों को वितरित किया गया। इस अवधि के दौरान केंद्र ने कुल रु.16.9 लाख राजस्व अर्जित किया।

विभिन्न केंद्रों द्वारा वितरित की गई विभिन्न किस्मों को पालने वाले किसानों से प्राप्त प्रतिक्रिया उत्साहजनक रही है।

कुक्कुट बीज परियोजना के तहत केंद्रवार जर्मप्लाज्म वितरण

केंद्र	जर्मप्लाज्म (सं.)	राजस्व (लाख रुपये में)
बीएएससु, पटना	41,544	20.49
भाकृअनुप-क्षेत्रीय केंद्र, झरनापानी	59,910	29.39
भाकृअनुप-नोफरी, गंगटोक	70,582	43.85
भाकृअनुप-क्षेत्रीय केंद्र, इंफाल	17,645	13.32
टीएएनयूवीएएस, होसुर	98,649	27.99
भाकृअनुप-सीसीएआरआई, गोवा	31,083	5.31
भाकृअनुप-सीआईएआरआई, पोर्ट ब्लेयर	1,200	-
एसकेयूएएसटी, श्रीनगर	18,113	6.97
एनईएचआर, उमियाम के लिए भाकृअनुप - क्षेत्रीय केंद्र	10,211	10.84
पीवीएनआरटीवीयू, वारंगल	62,972	16.90
एसवीवीयू, तिरुपति	22,169	2.39
कुल	**434,078**	**177.45**

2 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 CSKHPKVV, Palampur. The main objectives of the project are development of location specific chicken varieties, conservation, improvement, characterization and application of local native chickens, development of package of practices for village poultry and entrepreneurships 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 **6,54,618** chicken germplasm was distributed to the farmers from different centres. An amount of Rs. **207.16** lakhs revenue was generated through distribution and propagation of the improved chicken germplasm.

In the year 2021-22, AICRP on Poultry Breeding, Mannuthy centre, KVASU evaluated the S-6 generation of native chicken germplasm up to 40 weeks of age. The egg production up to 40 weeks of age was 75.75 eggs with an average egg weight of 43.95g at 40 weeks of age. The egg production decreased by 3.2 eggs, whereas 28- and 40-weeks' egg weight increased by 1.39 and 0.91g, respectively compared to the previous generation. The fertility (89.33%) and hatchability on TES and FES (82.80 and 92.75 %) was good. The centre has also evaluated S-32 generation of IWN and IWP strains of White Leghorn up to 72 weeks of age. The hen day egg production up to 72 weeks of age was 292.94 in IWN and 278.89 in IWP strain. The centre has generated a revenue of Rs.15.52 lakhs and has supplied a total of 30,238 number of germplasms during the year. The number of farmers benefitted through the germplasm supply from the centre during the current year was 305.

AAU, Anand centre evaluated the S-2 generation of *Ankleshwar* breed of chicken up to 40 weeks of age. Egg production of *Ankleshwar* chicken (S-2 gen) up to 40 weeks of age was 81.5 which was higher than that recorded in S-1 generation (76.4). The S-2 generation of IWN and IWP strains was evaluated up to 72 weeks of age. Egg production up to 72 weeks of age was 303.37 in IWN and 301.73 in IWP strain. The S-9 generation of IWD and IWK strains was evaluated up to 64 weeks of age. Egg production up to 64 weeks of age was higher in IWD (233.95) than IWK strain (222.58). The center has supplied a total of 70,311 germplasm during the reporting period. The center has generated the revenue of Rs. 33.48 lakhs during the reporting year.

Bengaluru centre evaluated native chicken, PB-1 and PB-2 lines and their crosses during the year. The five weeks body weight was 956.2 and 947.2 g in PB-1 and PB-2 lines, respectively. The egg production up to 40 weeks of age in PB-1 and PB-2 lines was 43.6 and 28.4 eggs, respectively. The body weight of native chicken (S-5) at 8, 20 and 40 weeks of age was 384.9, 1268 and 1482 g, respectively. The egg weight of native chickens at 40 weeks of age was 42.60 g. The phenotypic and genetic response of 5 weeks body weight in PB-1 was 9.74 and 30.68 g, respectively and corresponding values in PB-2 was 5.70 and 19.45 g, respectively. A total of 1,66,837 chicken germplasm was distributed to 325 farmers. The centre generated revenue of Rs. 46.67 lakhs during the year.

Ludhiana centre carried out the evaluation of *Punjab Brown*, PB-1 and PB-2 lines during the year. The five weeks' body weight was 1241 and 1152 g in PB-1 and PB-2 lines, respectively with corresponding FCR of 1.88 and 1.89, respectively. The egg production up to 40 weeks of age was 55.02 and 56.13 in PB-1 and PB-2 lines, respectively. In *Punjab Brown*, the 8 weeks' body weight was 615.9.6 g with FCR of 3.9. The egg production up to 52 weeks of age was 100.3 eggs in *Punjab Brown*. The egg weight at 36 weeks of age was 50.11 g. The centre distributed 85,999 germplasm to the 444 farmers. The centre generated revenue of Rs.28.36 lakhs.

ICAR-CARI centre evaluated the local native chicken (S-6) germplasm. The body weight, breast angle, shank

length and keel length of native chicken at 16 weeks of age was 1095 g, 34.03°, 7.68 cm, 9.55 cm in female and 1468 g, 37.50, 8.74 cm, 10.23 cm in male, respectively. Body weight at day old, 1, 2, 3, 4, 6 and 20 weeks of age in the dual-purpose cross (F1 x CSFL) at farm were 36.62, 157.5, 245.3, 419.9, 643.7, 917.5, 1154 and 2818 g, respectively. A total of 3163, 3518 and 795 good chicks of CSML, CSFL and control lines were produced. The body weight at 5 weeks of age in CSML, CSFL and control lines were 1243, 1262 and 838.9 g, respectively. A total 46,981 germplasm (20809 fertile eggs, 23,823 day old chicks and 2349 grownup birds) were supplied to 46 farmers and other stakeholders.

Bhubaneswar centre assigned to evaluate *Hansli*, CSML, CSFL and their crosses. A total of 161 good chicks of S-0 generation of *Hansli* chicken were hatched and average body weight at day old was 30.22 g. Body weight at 8 and 20 weeks of age in *Hansli* was 449.6 and 1535 g, respectively. The centre has procured hatching eggs of CSML and CSFL lines to re-establish.

Tripura centre evaluated the *Tripura Black*, *Dahlem Red*, broiler dam line and their crosses during the year. In E-5 evaluation of BND cross, the 72 weeks' egg production was 166.48 eggs under farm and 91.45 eggs up to 52 weeks at farmer's fields. E-6 evaluation of BND cross was completed up to 52 weeks under farm and up to 40 weeks of age under field conditions. During E-6 evaluation of BND cross, the 40 weeks' egg production recorded was 66.16 and 53.22 eggs under farm and field conditions, respectively. The body weight recorded in E-6 at 20 and 40 weeks of age showed slight reduction in comparison to previous (E-5) evaluation under farm. During the period, a total of 28,561 chicks were supplied to 738 farmers of Tripura with a revenue receipt of Rs. 12.24 lakhs.

Jabalpur centre evaluated G-1 population of *Jabalpur colour* and *Kadaknath* from 20 weeks of age onwards. Body weight of *Kadaknath* at 40, 52 and 72 weeks of age was 1500, 1640 and 1905g, respectively and that of *Jabalpur colour* at respective age *was* 1940, 2100 and 2710g. *Jabalpur colour* bird matured at 156 days while *Kadaknath* at 169 days of age. Hen day egg production of *Kadaknath* breed up to 40, 52 and 72 weeks of age was 63.0, 93.2 and 116.7 eggs, respectively and that of Jabalpur colour was 93.3, 161.0 and 247.5 eggs, respectively. G-2 replacement population were produced and evaluated for growth traits up to 6 weeks of age. The 6 weeks body weight of JB colour and *Kadaknath* was 705.3 and 399.4g, respectively. The 8- and 20-weeks body weight of *Narmadanidhi* was 763 and 1373 g, respectively for male and 629 and 1126 g for females under field conditions. Under field rearing egg production of *Narmadanidhi* up to 52 weeks were 91.2 eggs with average egg weight of 47 to 48 g. A total of 51,361 chicken germplasm was distributed to 411 farmers with revenue receipts of Rs. 30.57 lakhs only.

Udaipur centre evaluated *Mewari*, CSFL, RIR and *Pratapdhan* populations during the year. The body weight at 40 weeks of age was 1743 g in *Mewari* females. The egg production up to 52 weeks of age was 52.46 eggs in *Mewari* chicken. The annual egg production (up to 72 weeks of age) was 160.2 in *Pratapdhan*. The centre has evaluated meat type chicken germplasm under farm and field conditions. Four training programmes were organized benefitting 206 tribal farmers under TSP component of the project. A total of 20,108 improved chicken germplasm was distributed to about 353 farmers during the current year. The centre realized Rs 5.45 lakh during the year.

Palampur centre evaluated native germplasm, *Dahlem Red* and *Himsamridhi* during the year. In G-9 generation of native chickens, HHEP and HDEP up to 40 weeks of age was 46.09 and 47.26, respectively. The egg weight at 28 and 40 of age was 40.85±0.10 and 45.75±0.13g, respectively. In *Dahlem Red,* HHEP and HDEP up to 40 weeks of age was 78.70 and 80.65, respectively. The egg weight at 28 and 40 of age was 49.01±0.10 and 52.10±0.25g respectively. The HHEP up to 40 and 52 weeks of age of *Dahlem Red* x Native chickens cross were 66.31 and 106.96, respectively and HDEP up to 40 and 52 weeks were 68.04 and 111.6, respectively. The HHEP and HDEP up to 40 weeks of age were 71.65 and 72.81, respectively for *Himsamridhi* birds. During the year, the centre supplied a total of 70,333 chicks to farmers in different regions of the state including far flung tribal areas. The centre realised the receipts of Rs 19.52 lacks during the current year.

Guwahati centre evaluated native, *Dahlem Red* and PB-2 pure lines, BN and BND crosses and *Daothigir* populations up to 72 weeks of age. The body weights at 20 and 40 weeks of age in *Daothigir* were 1161 and 1851 g, respectively and the egg weight and egg production (Hen housed) up to 72 weeks were 36.90 g and 116.90 eggs, respectively. The ASM was 197.1 days. The 5 weeks body weight was 180.6 g in indigenous, 1221 g in PB-2 and 440.1 g in *Dahlem Red*. The *Kamrupa* variety was evaluated up to 72 weeks in farm and field conditions and the age at sexual maturity was 148.1 days in the farm and 169.1 days in the field. The hen housed egg production up to 40 weeks, 52 weeks and 72 weeks of age was 51.20, 92.80 and 155.50 eggs in the farm and corresponding values in the field were 45.30, 75.60 and 124.30 eggs, respectively. The centre supplied 44,077 germplasm to 202 farmers with a revenue receipt of Rs. 9.09 lakhs during the year.

Ranchi centre evaluated native chicken, *Dahlem Red*, PB-2 and *Jharsim*. The hen day egg production of native population was 102.8 eggs (G-9) at 64 weeks of age. The body weight at day old, 4 and 16 weeks of age were 28.12, 167.4 and 759.7 g in Native chicken during G10 generation. The hen day egg production in *Jharsim* was 133.23 eggs up to 64 weeks of age. The body weight at 8, 12 and 16 weeks of age in *Jharsim* (E-10) was 472.1,

946.8 and 1439 g, respectively. Centre supplied 39,812 germplasm among 208 farmers, NGOs, KVKs and other agencies. The revenue receipt was Rs. 6.26 lakhs.

Germplasm Supply and Revenue Generation during 2021-22

Centre	Germplasm supply (Nos.)	Revenue generated (Rs. In lakhs)
KVASU, Mannuthy	30,238	15.52
AAU, Anand	70,311	33.48
KVAFSU, Bengaluru	1,66,837	46.67
GADVASU, Ludhiana	85,999	28.36
OUAT, Bhubaneswar	0	0
ICAR-CARI, Izatnagar	46,981	0
NDVSU, Jabalpur	51,361	30.57
CSKHPKVV, Palampur	70,333	19.52
ICARRCNEH, Agartala	28,561	12.24
AAU, Guwahati	44,077	9.09
BAU, Ranchi	39,812	6.26
MPUAT, Udaipur	20,108	5.45
Total	**6,54,618**	**207.16**

Poultry Seed Project

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

The PSP centres are located at Bihar Animal Sciences University, Patna; West Bengal University of Animal and Fishery Sciences, Kolkata; 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 Telangana Veterinary University, Warangal; Sri Venkateshwara 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 2021-22 were between 0.4 and 1.0 lakh chicks per annum for different centres and to collect feedback on the performance of the germplasm under backyard farm conditions. A total of 4,34,078 improved chicken varieties have been distributed in their respective regions/states with a revenue receipt of Rs. 177.45 lakhs during the year.

One batch of *Vanaraja* parents was reared at Patna Centre. A total of 41,544 commercial chicken germplasm was distributed to the farmers in Bihar during the year 2021-22 with an amount of Rs. 20.49 lakhs revenue.

One batch each of *Vanaraja* and *Srinidhi* were in position at Jharnapani centre. A total of 59,910 improved chicken germplasm was distributed to farmers of Nagaland and neighbouring states during the year 2021-22. A total of Rs. 29.39 lakhs revenue was generated under PSP at Jharnapani Centre.

One batch of *Vanaraja* parents was reared at ICAR, NOFRI, Gangtok, Sikkim. A total of 70,582 improved chicken germplasm of *Vanaraja* was distributed to farmers in Sikkim with an amount of Rs. 43.85 lakhs revenue. The centre achieved the set target of germplasm.

One batch each of *Vanaraja* and *Srinidhi* parents were reared at Manipur Centre during the year. A total 17,645 improved chicken germplasm was distributed to the farmers in Manipur. The Centre has generated Rs. 13.32 lakhs of revenue during the year 2021-22.

Two batches of *Vanaraja* and one batch of *Gramapriya* parents were reared at Hosur Centre during the reporting period. A total of 98,649 improved rural chicken (*Vanaraja* and *Gramapriya*) germplasm was distributed to beneficiaries in Tamil Nadu. The Centre has generated total revenue of Rs. 27.99 lakhs during the year.

One batch of *Gramapriya* parents was reared at Goa during the year. A total of 31,083 improved chicken

germplasm was distributed to farmers in Goa, Karnataka and Maharashtra with a revenue of Rs. 5.31 lakhs.

One batch of *Nicobari* parents was reared under deep litter system at Port Blair. A total of 1200 chicken germplasm was distributed to farmers in Andaman & Nicobar Islands during the year.

One batch of *Vanaraja* parents was reared at ICAR RC for NEH Region, Umiam. A total 10,211 improved chicken germplasm was distributed to the farmers in Meghalaya with an amount of Rs. 10.84 lakhs of revenue.

Two batches of *Vanaraja* parents were reared at Srinagar centre. A total of 18,113 improved chicken germplasm was distributed to the farmers of Jammu and Kashmir with an amount of Rs. 6.97 lakhs of revenue.

Two batches of *Vanaraja* parents were maintained at SVVU, Tirupati, Andhra Pradesh. A total of 22,169 chicks were supplied to the farmers and generated Rs.2.39 lakhs as revenue by sale of chicks and eggs during the period.

Four batches of *Vanashree,* three batches of *Gramapriya,* two batches of Aseel and one batch each of *Kadaknath* and Ghagus parents were reared at PVNRTVU, Warangal, Telangana during the reporting period. A total of 62,972 improved rural chicken germplasm was distributed to the farmers. The centre has generated total revenue of Rs. 16.9 lakhs during the period.

Feedback received from farmers rearing different varieties that were distributed by different centres was encouraging.

Centre wise distribution of germplasm under Poultry Seed Project

Centre	Germplasm (Nos.)	Revenue (Rs. in lakhs)
BASU, Patna	41,544	20.49
ICARRCNEH, Jharnapani	59,910	29.39
ICARRCNEH, Gangtok	70,582	43.85
ICARRCNEH, Imphal	17,645	13.32
TANUVAS, Hosur	98,649	27.99
ICAR-CCARI, Goa	31,083	5.31
ICAR-CIARI, Port Blair	1,200	-
SKUAST, Srinagar	18,113	6.97
ICARRCNEH, H.Q., Umiam	10,211	10.84
PVNRTVU, Warangal	62,972	16.90
SVVU, Tirupati	22,169	2.39
Total	**434,078**	**177.45**

3 Budget

AICRP on Poultry Breeding (2021-22)

(Rs.in lakhs)

AICRP Centre	Actual budget released (ICAR share)	Budget for (State share)	* Total expenditure	Expenditure on feed	Receipts
KVASU, Mannuthy	68.00	22.66	90.66	11.76	15.52
AAU, Anand	67.00	22.32	89.32	37.56	33.48
KVAFSU, Bengaluru	77.00	25.66	102.66	39.59	46.67
GADVASU, Ludhiana	68.90	22.96	91.86	24.00	28.36
NDVSU, Jabalpur	87.00	29.00	116.00	42.94	30.57
CSKHPKV, Palampur	67.00	22.32	89.32	21.47	19.52
ICARRCNEH, Agartala	40.04	0.00	40.04	17.98	12.24
AAU, Guwahati	49.00	16.34	65.34	20.15	9.09
MPUAT, Udaipur	69.00	23.00	92.00	11.43	5.45
BAU, Ranchi	50.00	16.65	66.65	15.25	6.26
OUAT, Bhubaneswar	56.00	18.66	74.66	-	0
Total	**699.90**	**219.57**	**919.47**	**242.13**	**207.16**

Indicated total expenditure figure is released figure inclusive of ICAR share and State share

Poultry Seed Project (2021-22)

(Rs.in lakhs)

Centre	Budget released (2021-22)	*Total expenditure	Receipts
BVU, Patna	42.25	42.25	20.49
ICARRCNEH, Jharnapani	98.00	98.00	29.39
ICARRCNEH, Gangtok	70.83	70.83	43.85
ICARRCNEH, Imphal	60.00	60.00	13.32
ICARRCNEH, HQ, Umiam	66.17	66.17	10.84
TANUVAS, Hosur	44.86	44.86	27.99
ICAR-CCARI, Goa	9.60	9.60	5.31
ICAR-CIARI, PortBlair	6.75	6.75	-
SKUAST, Srinagar	18.40	18.40	6.97
PVNRTVU, Warangal	39.89	39.89	16.90
SVVU, Tirupati	28.25	28.25	2.39
Total	**485.00**	**485.00**	**177.45**

***Indicated Total expenditure figure is released figure**

4 All India Coordinated Research Project 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-a-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

Location of the centres of AICRP on poultry breeding

Sl. No	Name of the Centre	Period
1	Anand Agricultural University, Anand	06-07-1977 to 31-03-2022
2	Kerala Veterinary and Animal Science University, Mannuthy	19-02-1977 to 31-03-2022
3	Karnataka Veterinary, Animal and Fishery Sciences University, Ben- galuru	14-01-1970 to 31-03-2022
4	ICAR-Central Avian Research Institute, Izatnagar	01-04-1970 to 31-03-2022
5	Guru Angad Dev Veterinary and Animal Science University, Ludhiana	26-02-1977 to 31-03-2022
6	Orissa University of Agriculture and Technology, Bhubaneswar	21-01-1971 to 1990 and 01-09-1991 to 31-03-2022
7	ICAR Research Complex for NEH region, Agartala	01-08-2001 to 31-03-2022
8	Nanaji Deshmukh Veterinary Science University, Jabalpur	11-06-1970 to 31-03-2022
9	Assam Agricultural University, Guwahati	23-03-2009 to 31-03-2022
10	Birsa Agricultural University, Ranchi	23-03-2009 to 31-03-2022
11	Maharana Pratap University of Agriculture & Technology, Udaipur	23-03-2009 to 31-03-2022
12	CSK Himachal Pradesh Krishi Viswavidyalaya, Palampur	23-03-2009 to 31-03-2022
13*	ICAR-Directorate of Poultry Research, Hyderabad	

*Control Population Unit

to bio-chemical, immunological cytogenic 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 entrepreneurships in rural, tribal and backyard areas etc.

Monitoring role of the coordinating unit/ Directorate

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

5 Technical Program

Technical Programme in brief for the year 2021-2022

- Pedigreed hatching and evaluation of the local native chicken.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition and for development of cross.
- Production and evaluation of 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 there is demand for new type of variety (cross) the centre should conduct survey and establish the need for second variety before starting the work. The centres are strictly instructed to start the work only after the approval of the competent authority.

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

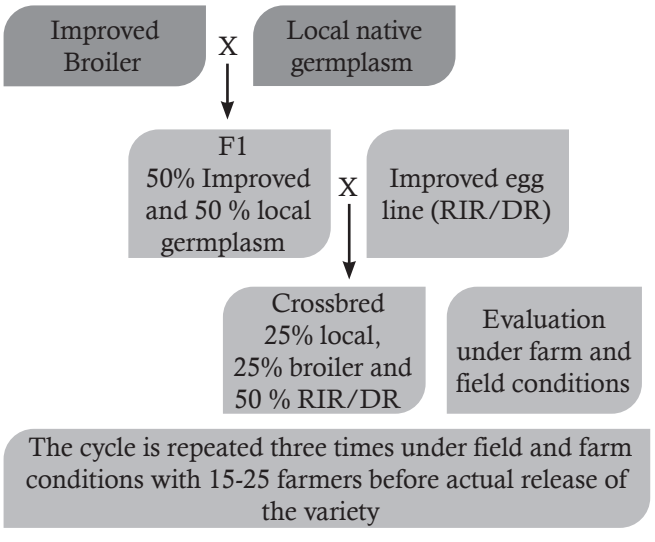
Development of crosses

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

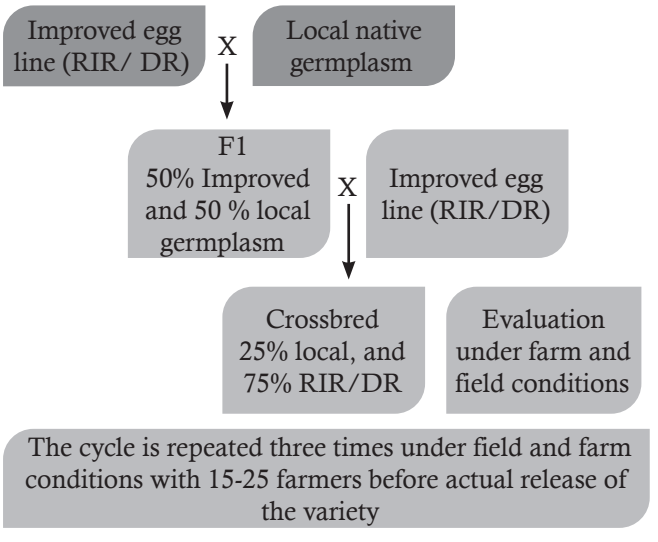
Flocks to be selected for Rural Poultry

- Local native chicken (with better phenotypic performance) in the respective agro-climatic zones

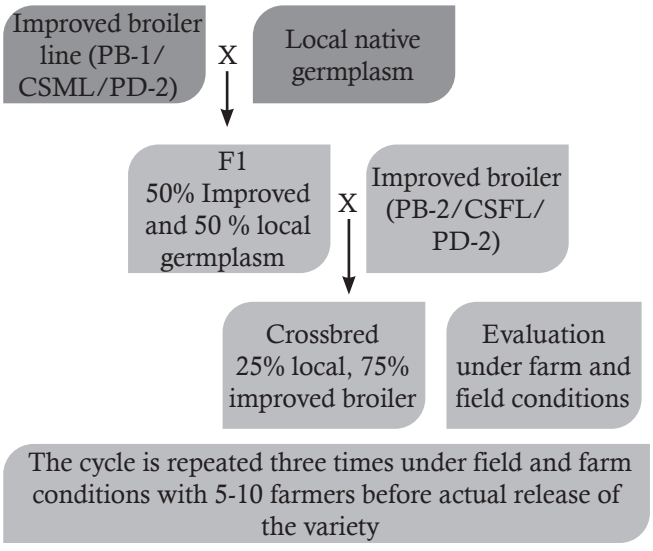
Technical program: Dual Type chicken



Technical program for Egg type chicken



Technical program for Meat type variety



(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 progenies 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 weeks body weight.
9. A total of 250 best males will also be selected on body weight at 5 weeks.
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 needs 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 progenies 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 weeks	Growers 6-18 weeks	Prebreeders 19-23 weeks	Breeders 24-54 weeks
Energy K.cal/kg	2800-2850	2750-2800	2750-2800	2800
Protein (%)	20	16	16	17
Lysine (%)	1.00	0.80	0.80	0.75
Methionine (%)	0.52	0.41	0.41	0.35
Ca (%)	1.0	1.0	2.00	- 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

6 Performance appraisal of AICRP centres

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 each year 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-6 generation of native chicken was evaluated up to 40 weeks.
- The S-32 generation of IWN and IWP strains of White Leghorn were tested up to 72 weeks of age.
- The S-33 generation of IWN (849 hens) and IWP (859 hens) strains of White Leghorn were tested up to 28 weeks of age.
- The body weight recorded at 16 weeks of age was 1179.98g and 1112.60g for IWN and IWP strains, respectively of S-33 generation.
- The age at sexual maturity was 129 and 132 days in IWN and IWP strains, respectively in S-33 generation.
- Hen-housed egg production up to 72 weeks of age was 292.94 and 278.89 in IWN and IWP strain, respectively. The hen-day and survivors' egg production up to 72 weeks of age were 301.82 and 302.05, respectively in IWN and 293.61 and 293.02, respectively in IWP strain of White Leghorn belonging to S-32 generation
- The egg weight at 28 weeks of age was 48.01 and 48.73g in IWN and IWP strains, respectively.
- IWN X Native (ND) was produced and the cross of ND male with RIR female (NDR) has been produced and evaluated in farm condition up to 72 weeks.
- The IWN X IWP birds, native chicks and their crosses were supplied to farmers and institutions.

Achievements

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

Production traits of native chicken

The S-6 generation of native chicken was evaluated up to 40 weeks of age and its production performance is presented in Table 1. The hen housed egg production up to 40 weeks of age is decreased by 3.2 eggs compared to S-5 generation (Table 1).

Table 1. Growth and production performances in S-6 generation of native chicken

Traits	N	Mean ±SE
Body weight (g)		
0 day	176	31.53±0.21
4 wks	358	254.3±2.17
8 wks	352	549.3±4.50
12 wks	340	822.5±8.56
20 wks	615	1056±6.81
40 wks	594	1304±7.58
ASM (d)	610	159.1±0.69
Egg weight (g)		
28 wks	518	39.64±0.15
40 wks	461	43.95±0.18
EP 40 wks (Nos.)		
Hen housed	615	75.75±1.04
Hen day	-	76.61
Survivors'	579	78.73±0.93

Fertility and hatchability

The S-6 generation of native chicken was produced by pedigree mating and its performance was evaluated up to 40 weeks of age. The number of sires and dams used for breeding to produce the S-6 generation was 50 and 250 (1:5). Fertility slightly reduced while hatchability increased in S-6 generation as compared to the previous generation (Table 2).

Table 2. 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-4	3	4196	91.71	3505	84.20	91.81
S-5	2	3473	91.50	2714	80.13	89.60
S-6	**3**	**3058**	**89.33**	**2485**	**82.80**	**92.75**

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 are presented in Table 3. In S-6 generation, 28 and 40 weeks' egg weight has increased and the 40 weeks' egg production has decreased when compared to the previous generation.

Table 3. Summary of growth and production performances of native chickens for last three generations

Traits	Females			Males		
	S-6	S-5	S-4	S-6	S-5	S-4
Body wt. (g)						
0 day	31.53	28.68	28.47	32.17	28.50	27.37
4 wks	254.3	236.0	168.4	264.6	245.6	171.3
8 wks	549.3	437.3	456.5	638.3	553.4	577.5
12 wks	736.3	886.9	917.3	1079	1164	1248
ASM (d)	**159.1**	155.9	142.6	-	-	-
Egg wt. (g)						
28 wks	**39.64**	38.25	39.30	-	-	-
40 wks	**43.95**	43.04	43.37	-	-	-
EP 40 wks (Nos.)						
Hen Housed	**75.75**	78.95	79.20	-	-	-
Hen day	**76.61**	82.30	82.33	-	-	-
Survivors'	**78.73**	83.10	84.90	-	-	-

Mortality

The mortality during 9-16 and 17-40 weeks in S-6 generation of native birds was within the permissible level. Less mortality was observed during 0-8 weeks and 9-16 weeks of age (Table 4).

Table 4. Mortality (%) records of native birds for last three generations

Gens.	0-8 wks	9-16 wks	17-40 wks
S-4	0.89	1.28	3.38
S-5	2.47	4.56	**5.07**
S-6	**2.36**	**3.60**	**6.24**

Performance evaluation of three way cross (NDR)

During the current year, the crossbred of ND male (IWN X Native) with RIR female (NDR) was produced and evaluated in farm conditions up to 72 weeks of age and results are given in Table 5.

Table 5. The performance of three way cross (NDR) at farm condition

Traits		Female		Male
Body wt. (g)	**N**		**N**	
0 day	372	35.07±0.19	246	35.71±0.24
4 wks	382	271.4±1.87	159	301.4±2.99
8 wks	343	549.2±4.28	188	682±6.16
12 wks	347	976±6.3	164	1292±11.0
16 wks	578	1127±6.2	154	1654±15.9
28 wks	500	1581±8.2	149	2425±17.6
40 wks	433	1666±7.9	142	2441±19.3
64 wks	374	1822±11.1		
ASM (d)	503	155.8±0.6	-	
Egg wt. (g)				
28 wks	469	47.51±0.17		
40 wks	316	50.46±0.25		
64 wks	274	54.88±0.29		
72 wks	147	56.65±0.39		
EP to 40 wks (Nos.)				
Hen Housed	478	84.76±1.05		
Hen day	-	94.68		
Survivors'	425	87.80±0.97		
EP to 64 wks (Nos.)				-
Hen Housed	478	145.8±2.46		
Hen day	-	160.47	-	
Survivors'	383	159.9±2.33		
EP to 72 wks (Nos.)				
Hen Housed	478	165.0±3.00		
Hen day	-	185.06		-
Survivors'	372	183.9±0.97		

B. Improvement of IWN and IWP strains of White Leghorn

The centre evaluated the S-32 generation of IWN and IWP strains of White Leghorn up to 72 weeks of age.

Selection records: The summary of selection records for last four generations is presented in Table 6.

Incubation records

Fertility in S-33 generation of IWN and IWP strains was less when compared to the previous generation. Hatchability on total and fertile egg set basis were also

lower in both strains as compared to previous generation (Table 7). This may be due the incubation of eggs of birds aged more than 72 weeks.

Mortality

The mortality of IWN was 2.29 and 5.45% during 17-40 and 17-64 weeks, respectively and same was 3.67 and 12.67% in IWP strain of S-32 generation (Table 8). The mortality in IWP strain during 17-64 weeks of age was slightly higher than the maximum expected level of 1% per month. In S-33 generation, the mortality of IWN birds was 3.89 and 1.51% during 0-8 and 9-16 weeks of age, respectively and same was 6.87 and 1.53% in IWP strain. The mortality was within the permissible level

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

Strains	Gens.	Sires	Dams	Ne (Contributed)	SD in females	SI (σ)
IWN	S-28	50	278	169.5	14.40	0.58
	S-29	50	277	169.4	14.39	0.32
	S-30	50	298	171.3	10.55	0.27
	S-31	50	280	169.7	8.46	0.42
IWP	S-28	50	275	169.2	17.90	0.49
	S-29	50	263	165.2	16.66	0.33
	S-30	50	297	171.2	10.26	0.29
	S-31	50	282	169.9	11.58	0.58

Table 7. Incubation records in last three generations

Gens.	Strains	No. of hatches	No. of eggs set	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
						TES	FES
S-30	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-31	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
S-32	IWN	**2**	**3569**	**80.10**	**2496**	**65.24**	**85.84**
	IWP	**2**	**3320**	**81.08**	**1869**	**60.70**	**78.16**
	Control	**1**	**612**	**85.30**	**400**	**65.36**	**77.52**

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

Gens.	Strains	0-8 wks	9-16 wks	17-40 wks	17-64 wks
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	0.97	2.29	5.45
	IWP	5.82	1.41	3.67	12.67
	Control	4.59	0.00	5.48	4.35
S-33	**IWN**	**3.89**	**1.51**		
	IWP	**6.87**	**1.53**		
	Control	**4.00**	**0.64**		

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-32 generation is presented in Table 9. The hen day egg production up to 64 weeks of age increased by 0.1 eggs and 4.6 eggs in IWN in IWP strains, respectively. The survivors' egg production up to 64 weeks of age marginally decreased in both the strains when compared to previous generation.

Egg number

The birds in S-32 generation have completed the performance evaluation up to 64 weeks of age during the reporting period (Table 10). In this generation, hen day egg production up to 64 weeks of age increased in both IWN and IWP by 0.1 eggs (267.8) and 4.6 eggs (256.8), respectively on phenotypic scale as compared to the previous generation

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

Gen.	IWN			IWP			Control		
	HH64	HD64	Sur64	HH64	HD64	Sur64	HH64	HD64	Sur64
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
S-32	**262.4**	**267.8**	**268.0**	**249.6**	**256.8**	**257.1**	**172.2**	**179.6**	**180.7**

Table 10. Growth and production performances in S-32 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	900	960.8±2.5	879	926.4±2.63	73	916.4±10.99
40 wks	788	1504±5.49	843	1437±6.11	69	1316±17.28
64 wks	723	1558±6.56	729	1471±6.67	66	1306±25.61
ASM (d)	895	142.0±0.27	879	140.8±0.29	72	147.8±1.21
EP 40 wks (Nos.)						
Hen housed	893	127.9±0.50	879	125.52±0.63	73	92.74±3.45
Survivors'	883	128.8±0.41	867	126.27±0.58	69	96.16±3.08
Hen day	-	128.6		126.0		92.74
EP 64 wks (Nos.)						
Hen housed	893	262.4±1.28	879	249.6±1.5	73	172.1±7.04
Survivors'	811	268.0±0.94	727	257.1±1.22	67	180.7±6.21
Hen day	-	267.8		256.8		179.6
Egg weight (g)						
28 wks	885	49.47±0.10	859	48.91±0.10	69	46.28±0.40
40 wks	872	51.61±0.11	849	51.61±0.11	57	50.79±0.53
64 wks	708	51.83±0.17	571	51.76±0.21	46	51.32±0.64
EP 72 wks (Nos.)						
Hen housed	475	292.9±2.08	443	278.9±2.41		
Survivors'	419	302.0±1.42	373	293.0±1.87		
Hen day		301.8		293.6		

Body weights and ASM

The body weight recorded at 16 weeks of age was 1180g for IWN and 1113g for IWP strain (Table 11). The age at sexual maturity of IWN and IWP strains was 129.4 and 132.5 days, respectively in S-33 generation, which was 12.5 and 8.3 days less when compared to previous generation (Table 12).

Frequency distribution

The frequency of egg production up to 64 weeks of age in IWN and IWP strains in S-32 generation was maximum in the class interval of 261-280, while same was maximum in the class interval of 221-240 in control population (Table 13). The trend was similar to that of earlier generation.

Table 11. Growth and production performances in S-33 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	845	1180±4.13	856	1113±3.50	124	1023±10.72
ASM (d)	843	129.4±0.33	855	132.5±0.33	124	142.8±0.67
Egg weight (g)						
28 wks	775	48.01±0.12	792	48.73±0.11	111	48.80 ± 0.29

Table 12. 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-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
S-32	**141.9**	**1558**	**140.8**	**1471**	**147.8**	**1306**
S-33	**129.4**		**132.5**		**142.8**	

Table 13. Frequency distribution of egg production up to 64 weeks of age (S-32 generation)

Class interval	IWN	IWP	Control
<100	0.017	0.025	0.097
101 - 120	0.001	0.008	0.083
121 - 140	0.003	0.007	0.056
141 - 160	0.006	0.014	0.083
161 - 180	0.008	0.014	0.153
181 - 200	0.013	0.026	0.139
201 - 220	0.026	0.043	0.153
221 - 240	0.039	0.087	**0.181**
241 - 260	0.187	0.259	0.028
261 - 280	**0.412**	**0.367**	0.028
281 - 300	0.281	0.150	0.00
>300	0.007	0.001	0.00

Egg weight

The egg weight at 28 weeks of age decreased by 1.46 and 0.18g in IWN and IWP strains in S-33 generation compared to last generation. (Table 14).

Heritability estimates

In IWN strain, heritability estimate (sire)) of EP40, ASM, BW16, BW40, BW64, EW28, EW40 and EW64 were high in magnitude (Table 15). However, the heritability estimates (sire) for EP64 was low in magnitude. In IWP strain, the heritability estimates were high in magnitude for BW16, BW40, BW64, EW28, EW40 and EW64. However, heritability estimate (sire) of ASM, EP40 and EP64 were moderate in magnitude.

Table 14. 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-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
	S-32	49.47±0.10	51.61±0.11	51.83±0.17
	S-33	48.01±0.12	-	-
IWP	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
	S-32	48.91±0.1	51.61±0.11	51.06±0.21
	S-33	48.73±0.11	-	-
Control	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
	S-32	46.28±0.40	50.79±0.53	51.32±0.64
	S-33	48.80±0.29	-	-

Table 15. Heritability estimates of different traits in IWN and IWP strains (S-32 gen.)

Strains	Traits	Sire	Dam	Sire+Dam
IWN	ASM	0.35±0.12	0.32±0.14	0.34±0.07
	BW16	0.34±0.12	0.75±0.15	0.55±0.08
	BW40	0.59±0.17	0.53±0.16	0.56±0.08
	BW64	0.36±0.12	0.32±0.14	0.34±0.07
	EW28	0.25±0.10	0.55±0.14	0.40±0.07
	EW40	0.39±0.13	0.25±0.14	0.32±0.07
	EW64	0.28±0.11	0.37±0.15	0.37±0.08
	EP40	0.27±0.11	0.14±0.13	0.21±0.06
	EP64	0.03±0.06	0.41±0.14	0.22±0.06
IWP	ASM	0.14±0.08	0.02±0.13	0.08±0.05
	BW16	0.52±0.15	0.31±0.14	0.41±0.07
	BW40	0.39±0.13	0.31±0.14	0.35±0.07
	BW64	0.44±0.14	0.42±0.16	0.43±0.05
	EW28	0.32±0.12	0.24±0.14	0.28±0.07
	EW40	0.24±0.10	0.41±0.15	0.32±0.07
	EW64	0.20±0.13	0.17±0.16	0.21±0.07
	EP40	0.11±0.08	0.00±0.00	0.05±0.05
	EP64	0.13±0.08	0.00±0.00	0.06±0.05

Phenotypic and genetic response

The phenotypic response realized in S-32 generation when compared with the previous generation for hen-housed, hen-day and survivors' egg production up to 64 weeks of age were -0.06, 0.05 and -0.7 eggs in IWN strain (Response was positive for hen day and negative for hen housed and survivors'). The respective values for IWP strain were 1.95, 4.6 and -2.15 eggs (Table 16). The genetic response for egg weight at 64 weeks and hen housed, hen day and survivors' egg production up to 40 weeks was positive in both IWN and IWP strains in S-32 generation. The hen housed, hen day and survivors' egg production up to 64 weeks was positive in IWP strain whereas it remained positive only for survivors' egg production in IWN strain in S-32 generation (Table 16).

Implementation of DAPSC component

Mannuthy centre has implemented the development action plan for scheduled cast (DAPSC) scheme for the year by supplying 10 numbers of 8 weeks old *Tellichery* native chicken and a wooden coop each to 140 schedule caste farmers of Nadathara grama panchayat, Thrissur district, Kerala.

Supply of germplasm

Total germplasm supply from the centre was 30,238 and 305 farmers were benefitted through the supply of germplasm during 2021-22.

Revenue generation

The centre has generated revenue of Rs.15.52 lakhs which is 132.40% of the recurring expenditure (feed cost of Rs. 11.76 lakhs).

Table 16. Phenotypic and genetic response (gain) in primary and various correlated traits in S-32 generation

Traits	Phenotypic		Genetic	
	IWN	IWP	IWN	IWP
ASM (d)	-2.39	1.24	-2.76	0.86
Body weight (g)				
16 wks	-87.2	-155.8	68.56	-101.6
40 wks	72.42	41.09	31.33	121.91
64 wks	56.14	-26.01	82.15	163.27
Egg weight (g)				
28 wks	-0.82	-1.14	-0.46	-0.78
40 wks	0.62	1.17	-0.55	1.16
64 wks	-0.06	-1.97	1.91	2.3
EP 40 wks (Nos.)				
Hen Housed	6.74	1.09	5.65	3.26
Hen Day	6.48	2.99	3.49	6.12
Survivors'	6.21	2.18	4.03	2.86
EP 64 wks (Nos.)				
Hen Housed	-0.66	1.95	-2.61	4.3
Hen Day	0.05	4.6	-4.55	5.64
Survivors'	-0.7	-2.15	1.45	1.62

Anand Agricultural University, Anand (Gujarat)

Activities assigned

- Conservation, characterization and improvement of *Ankleshwar* breed of chicken.
- 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 in IWN and IWP strains.
- To participate with IWN X IWP cross in RSPP tests being conducted by Govt. of India.
- Development of location specific chicken variety (egg type)

Action taken

- The S-2 generation of *Ankleshwar* chicken was evaluated up to 40 weeks of age.
- The S-3 generation of *Ankleshwar* chicken was produced and is being evaluated.
- The S-2 generation of IWN and IWP strains was evaluated up to 72 weeks of age.
- The S-3 generation of IWN and IWP strains was produced and is being evaluated.
- The S-9 generation of IWD and IWK strains was evaluated up to 64 weeks of age.
- The S-10 generation of IWD and IWK strains was produced and is being evaluated.

Achievements

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

Evaluation of *Ankleshwar* chicken germplasms (S-2 gen)

During the reporting period, chicks of S-2 generation of *Ankleshwar* breed were produced and evaluated up to 40 weeks of age. A total of 1,220 pullets of *Ankleshwar* chicken were housed individually at 16 weeks of age and evaluated up to 40 weeks of age.

Incubation Records

Fertility and hatchability were higher in S-3 generation as compared to S-0, S-1 and S-2 generation (Table 17).

Table 17. Incubation records of *Ankleshwar* breed

Gen.	Eggs set (Nos.)	Good chicks (Nos.)	Fertility (%)	Hatchability (%)	
				TES	FES
S-0	7614	3655	64.04	49.63	77.50
S-1	6299	3615	71.85	60.07	83.61
S-2	6269	3841	77.68	63.23	81.40
S-3	**5935**	**3972**	**80.81**	**71.78**	**88.82**

Production performance

Age at sexual maturity was decreased in S-2 generation of *Ankleshwar* chicken in comparison to S-0 and S-1 generation. Body weight at 16 and 40 weeks of age was increased in S-2 generation as compared to S-1 generation. Egg production up to 40 weeks of age was higher in S-2 generation as compared to S-0 and S-1 generation. Egg weight at 28 and 40 weeks of age was almost similar in S-0, S-1 and S-2 generations (Table 18).

Mortality

Mortality of birds during 0-8, 9-16 and 17-40 weeks of age was within permissible range in S-0, S-1 and S-2 generations (Table 19).

B. Improvement of IWN and IWP strains of White Leghorn

During the period under report the S-2 generation of IWN and IWP strains was evaluated up to 64 weeks of age. The summary of selection records of IWN and IWP strains is presented in Table 20.

Incubation records

The summary of incubation records of IWN, IWP and Control population is presented in Table 21. Fertility and hatchability were higher in control population as compared to IWN and IWP strains in S-3 generation.

Mortality

Mortality in IWN, IWP and control population was under permissible limit during 0-8 weeks of age. Mortality in IWN and control population was higher during 9-16 weeks of age due to incidences of CIA. Mortality in IWP and control population was higher during 41-64 weeks of age due to incidences of heat stroke (Table 22).

Table 18. Production performance of *Ankleshwar* breed

Traits	S-2 Gen.		S-1 Gen.		S-0 Gen.	
	N	Mean ± S.E.	N	Mean ± S.E.	N	Mean ± S.E.
No. of pullets housed	1220	-	1310	-	1481	-
ASM (d)	1212	145.5±0.36	1058	150.8±0.32	1441	156.8±0.40
Body weight (g)						
16 wks	1220	966±2.58	1310	937±2.66	1481	1003±2.89
40 wks	1170	1571±5.77	1033	1548±4.95	1405	1545±7.96
EP 40 wks (Nos.)						
Survivors'	1170	81.5±0.71	1033	76.4±0.63	1405	71.1±0.62
Hen housed	1220	79.93±0.74	1310	65.6±0.70	1481	68.7±0.65
Hen day	-	80.27	-	73.30	-	70.12
Egg weight (g)						
28 wks	1068	37.45±0.09	1024	37.81±0.11	1215	37.05±0.09
40 wks	887	42.63±0.12	774	42.73±0.13	1136	43.76±0.11
Feed cons./bird (kg) 17-40 wks	-	16.87	-	16.08	-	15.98

Table 19. Mortality in *Ankleshwar* breed during different periods

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-0	3655	190	5.20	3465	73	2.11	1481	76	5.13
S-1	3615	141	3.90	3474	75	2.16	1310	68	5.19
S-2	**3841**	**161**	**4.19**	**2900**	**23**	**0.79**	**1220**	**50**	**4.10**

Table 20. Selection records of IWN and IWP strain in S-1 to S-2 generation

Sr. No.	Particulars	IWN	IWP
1	No. of sires used	50	50
2	No. of dams used	300	300
3	No. of sires contributed to the next generation	50	50
4	No. of dams contributed to the next generation	263	251
5	Effective Nos. using Sr. No.3 & 4	168.05	166.78
6	Rate of inbreeding	0.0030	0.0030
7	Expected S. D. in females of S-1 generation	5.30	5.62
8	Phenotypic standard deviation of S-1 generation	25.00	26.15
9	Intensity of selection	0.212	0.215
10	Heritability of 64 weeks egg production of S-1 generation	0.19	0.03
11	Expected response	1.01	0.17

Table 21. Incubation records of IWN, IWP and control population over the generations

Gens.	Strains	Eggs set (Nos.)	Good chicks (Nos.)	Fertility (%)	Hatchabilit (%)	
					TES	FES
S-0	IWN	2181	1842	94.96	85.92	90.49
	IWP	2207	1856	92.48	85.23	92.16
	Control	807	610	90.33	78.31	86.69
S-1	IWN	1258	890	88.31	74.64	84.52
	IWP	1455	1001	86.12	73.20	85.00
	Control	812	661	89.66	83.50	93.13
S-2	IWN	1432	1061	85.68	76.54	89.32
	IWP	1385	930	84.26	70.83	84.06
	Control	786	622	85.62	80.41	93.91
S-3	IWN	**1603**	**1105**	**83.78**	**71.30**	**85.11**
	IWP	**1337**	**780**	**74.50**	**62.60**	**84.04**
	Control	**809**	**654**	**87.52**	**82.20**	**93.93**

Table 22. Mortality of IWN, IWP and Control population over three generations

Gens.	Strains	0-8 wks	9-16 wks	17-40 wks	41-64 wks	17-64 wks
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
S-1	IWN	2.96	4.35	2.69	2.76	5.38
	IWP	4.83	0.56	1.99	1.45	3.42
	Control	4.52	1.28	1.11	2.25	3.33
S-2	**IWN**	**4.15**	**10.30**	**4.01**	**3.90**	**7.75**
	IWP	**7.31**	**1.91**	**4.51**	**9.44**	**13.52**
	Control	**4.30**	**7.27**	**5.56**	**6.47**	**11.67**

Table 23. Egg production in IWN, IWP and Control population over three generations

Traits	Gens.	IWN	IWP	Control
EP40	S-0	122.69	121.13	101.63
	S-1	130.50	133.40	107.75
	S-2	**126.77**	**124.95**	**108.59**
EP64	S-0	280.45	266.96	218.80
	S-1	268.60	271.66	210.56
	S-2	**264.06**	**261.59**	**222.53**
EP72	S-0	324.46	306.28	-
	S-1	307.24	309.79	-
	S-2	**303.37**	**301.73**	-

Table 24. Age at sexual maturity and egg weights in IWN, IWP and Control population over three generations

Traits	Gens.	IWN	IWP	Control
ASM	S-0	143.7	140.5	148.8
	S-1	133.8	130.9	145.7
	S-2	**138.7**	**133.2**	**140.7**
EW40	S-0	52.33	53.31	51.62
	S-1	52.05	52.69	52.34
	S-2	**52.62**	**52.87**	**52.93**
EW64	S-0	55.30	54.17	55.95
	S-1	54.59	54.29	53.84
	S-2	**53.78**	**54.22**	**54.91**

Production performance of IWN, IWP and Control population (S-2 gen)

The production performance of IWN, IWP and control population during S-2 generation is presented in Table 25. A total of 374, 355 and 180 pullets of IWN, IWP and control population, respectively were housed individually at 16 weeks of age.

Table 25. The performance of IWN, IWP and Control population (S-2 gen)

Traits	IWN		IWP		Control	
	N	Mean ± S.E.	N	Mean ± S.E.	N	Mean ± S.E.
No. of pullets housed	374	-	355	-	180	-
ASM (d)	371	138.7±0.52	348	133.2±0.49	177	140.7±0.83
Body weight (g)						
16 wks	374	1096±6.14	355	1041±5.23	180	1040±5.49
40 wks	359	1656±7.82	339	1636±7.19	170	1660±12.53
64 wks	345	1729±10.00	307	1761±10.99	159	1684±15.49
72 wks	339	1744±11.40	302	1779±10.40	-	-
EP 40 wks (Nos.)						
Survivors'	359	126.8±0.79	339	124.9±1.29	170	108.6±1.67
Hen housed	374	122.4±1.42	355	120.8±1.62	180	105.2±2.00
Hen day	-	125.9	-	124.1	-	108.5
EP 64 wks (Nos.)						
Survivors'	345	264.1±1.83	307	261.6±2.31	159	222.5±3.27
Hen housed	374	249.8±3.26	355	242.6±3.57	180	210.4±4.20
Hen day	-	260.6	-	259.7	-	222.3
EP 72 wks (Nos.)						
Survivors'	339	303.4±2.28	302	301.7±2.85	-	-
Hen housed	374	285.5±3.89	355	277.0±4.36	-	-
Hen day	-	298.4	-	298.2	-	-
Egg weight (g)						
28 wks	363	50.59±0.13	345	50.73±0.13	170	50.20±0.19
40 wks	359	52.62±0.13	323	52.87±0.16	162	52.93±0.21
64 wks	311	53.78±0.17	280	54.22±0.18	152	54.91±0.22
72 wks	292	54.04±0.22	271	54.34±0.20	-	-
Feed consumption / bird (kg)						
0-08 wks	-	1.65	-	1.62	-	1.58
9-16 wks	-	3.53	-	3.48	-	3.53
17-40 wks	-	17.56	-	17.64	-	17.50
17-64 wks	-	35.95	-	36.09	-	35.89
17-72 wks	-	42.14	-	42.23	-	-
Mortality (%)						
0-08 wks	-	4.15	-	7.31	-	4.30
9-16 wks	-	10.30	-	1.91	-	7.27
17-40 wks	-	4.01	-	4.51	-	5.56
17-64 wks	-	7.75	-	13.52	-	11.67
17-72 wks	-	9.36	-	14.93	-	-

Growth performance

Body weight recorded at 16 and 40 weeks of age was almost similar among IWN, IWP and control population in S-2 generation. Similarly, body weight recorded at 64 and 72 weeks of age was almost similar within IWN and IWP populations (Table 25).

Egg production performance

Egg production up to 40, 64 and 72 weeks of age was lower in IWN and IWP strains in S-2 generation as compared to S-1 generation (Table 23). Egg production up to 72 weeks of age was higher in IWN as compared to IWP strain in S-2 generation (Table 25). Egg production up to 40 and 64 weeks of age was higher in control population in S-2 generation as compared to S-1 generation (Table 7).

Age at sexual maturity and egg weight

Age at sexual maturity was less in IWP strain as compared to IWN strain and control population in S-2 generation. Egg weight at 40 and 64 weeks of age was almost similar in IWN, IWP and control population in S-2 generation. Similarly, egg weight at 72 weeks of age was almost similar in IWN and IWP strains in S-2 generation (Table 25).

Feed consumption

Feed consumption during 17-40 and 17-64 weeks of age in IWN, IWP and control population in S-2 generation was almost similar. Feed consumption during 17-72 weeks of age in IWN and IWP strains in S-2 generation was almost similar (Table 25).

C. Improvement of IWD and IWK strains of White Leghorn

Incubation records

The summary of incubation records of IWD and IWK lines during last three generations is presented in Table 26. Fertility and hatchability were higher in S-10 generation as compared to S-9 generation of IWD and IWK strains.

Production performance of IWD and IWK strains (S-9 Gen.)

Performance of IWD and IWK strains in S-9 generation is presented in Table 27. Age at sexual maturity in IWD and IWK strains was almost similar. Body weight at 16, 40 and 64 weeks of age in IWD and IWK strains was almost similar. Egg production up to 40 and 64 weeks of age was higher in IWD strain as compared to IWK strain. Egg weight at 28, 40 and 64 weeks of age was almost similar in both the strains. Feed consumption was almost similar in both the strains. Mortality was within permissible limit in both the strains.

Heritability estimates

In IWN strain (S-2 generation), heritability estimate (sire component) of ASM, EW28, EW40, EW64 and egg production up to 64 weeks was low in magnitude, whereas, heritability estimate (sire component) of BW16, BW40 and egg production up to 40 weeks was medium in magnitude and it was high in magnitude for BW64 (Table 28).

In IWP strain (S2 generation), heritability estimate (sire component) of BW40, EW28 and EW40 was low in magnitude, whereas, heritability estimate (sire component) of egg production up to 40 weeks was medium in magnitude and it was high in magnitude for ASM, BW16, BW64, EW64 and egg production up to 64 weeks (Table 12).

Frequency distribution

The frequency distribution of egg production up to 64 weeks of age in IWN and IWP strains in S-2 generation was maximum in the class interval of 261-270 and 281-290, respectively, while in control population, it was maximum in the class interval of 231-240 (Table 29).

Table 26. Incubation records of IWD and IWK strains during last three generations

Gen.	Strains	Eggs set (Nos.)	Good chicks (Nos.)	Fertility (%)	Hatchability (%)	
					TES	FES
S-8	IWD	908	657	95.48	74.78	78.31
	IWK	881	649	95.69	78.32	81.85
S-9	IWD	1183	734	78.78	65.43	83.05
	IWK	987	659	80.04	69.30	86.58
S-10	**IWD**	**1067**	**791**	**89.32**	**78.91**	**88.35**
	IWK	**981**	**756**	**89.91**	**80.73**	**89.80**

Table 27. The production performance of IWD and IWK strains (S-9 gen)

Traits	IWD		IWK	
	N	Mean±S.E.	N	Mean±S.E.
No. of pullets housed	225	-	225	-
ASM (d)	222	139.36 ± 0.82	225	140.07±0.82
Body weight (g)				
16 wks	225	1127±6.27	225	1095±5.90
40 wks	218	1561±11.36	214	1600±14.47
64 wks	206	1697±11.27	205	1712±9.66
EP 40 wks (Nos.)				
Survivors'	218	112.4±1.55	214	109.1±1.46
Hen housed	225	109.9±1.80	225	105.6±1.78
Hen day	-	111.9	-	108.6
EP 64 wks (Nos.)				
Survivors'	206	233.9±3.06	205	222.6±2.72
Hen housed	225	223.9±3.91	225	210.9±3.80
Hen day	-	231.9	-	221.3
Egg weight (g)				
28 wks	216	50.89±0.19	217	50.70±0.21
40 wks	198	52.81±0.23	204	52.75±0.24
64 wks	184	55.91±0.33	173	55.24±0.27
Feed consumption / bird (kg)				
0-8 wks	-	1.55	-	1.59
9-16 wks	-	3.49	-	3.51
17-40 wks	-	17.43	-	17.68
17-64 wks	-	36.19	-	36.05
Mortality (%)				
0-8 wks	-	3.95	-	1.97
9-16 wks	-	1.28	-	1.55
17-40 wks	-	3.11	-	4.89
17-64 wks	-	8.44	-	8.89

Table 28. Heritability estimates (Sire component) in S-2 generation

Trait		Strain	
		IWN	IWP
	Age at first egg	0.073±0.134	0.352±0.199
Body weight at	16 wks	0.169±0.147	0.424±0.206
	40 wks	0.115±0.145	0.049±0.167
	64 wks	0.261±0.170	0.508±0.232
Egg production	Up to 40 wks	0.130±0.148	0.164±0.182
	Up to 64 wks	0.030±0.134	0.353±0.204
Egg weight at	28 wks	0.056±0.136	0.085±0.165
	40 wks	0.060±0.137	0.068±0.174
	64 wks	0.095±0.163	0.215±0.215

Table 29. Frequency distribution of egg production up to 64 weeks of age in S-2 generation

Class Interval	IWN		IWP		Control	
	No	%	No	%	No	%
<151	3	0.87	11	3.58	7	4.40
151-160	0	0.00	1	0.33	1	0.63
161-170	2	0.58	1	0.33	4	2.52
171-180	3	0.87	1	0.33	3	1.89
181-190	5	1.45	5	1.63	9	5.66
191-200	3	0.87	2	0.65	3	1.89
201-210	3	0.87	9	2.93	18	11.32
211-220	9	2.61	7	2.28	15	9.43
221-230	12	3.48	11	3.58	23	14.47
231-240	17	4.93	14	4.56	25	15.72
241-250	24	6.96	17	5.54	17	10.69
251-260	37	10.72	32	10.42	13	8.18
261-270	59	17.10	28	9.12	13	8.18
271-280	56	16.23	50	16.29	5	3.14
281-290	46	13.33	63	20.52	3	1.89
291-300	45	13.04	37	12.05	0	0.00
301-310	18	5.22	17	5.54	0	0.00
311-320	3	0.87	1	0.33	0	0.00
Total	**345**	**100.00**	**307**	**100.00**	**159**	**100.00**

Implementation of DAPSC component

Under development action plan for scheduled castes (DAPSC), A total 50 beneficiaries of 10 different nearby taluka of Anand and Kheda districts were selected and briefed about the objectives of DAPSC component of AICRP on Poultry Breeding, benefits to be given to them and their responsibilities regarding related aspects of rearing and maintenance of birds. Simultaneously, chicks of " *Ankleshwar"* breed were produced and reared at Poultry Research Station. A training cum kit distribution programme was organized on 28-03-2022 at Poultry Research Station. Each beneficiary was given one unit as input. One unit included 22 reared chicks of " *Ankleshwar"* breed, one catching crate (as night shelter), 50 kg of poultry feed (grower mash), 15 plastic egg trays, medicines and one text book of "Poultry Production" in Gujarati language.

Germplasm supply

The centre has supplied a total of 70,311 germplasms during the year 2021-22. A total of 1390 farmers were benefited, among them, 143 farmers were directly benefited and 1247 farmers were benefited through IPDP centers, KVK and NGO.

Revenue generation

The center has generated the revenue of Rs. 33.48 lakhs during the reporting period, which was 89.14 % of the total expenditure of feed cost (37.56 lakhs).

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

Activities assigned

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

Action taken

- Centre completed purification of local native chicken and evaluated for growth and production
- The S-6 generation of native chicks produced.
- Production traits of PB-1 (S-13), PB-2 (S-26) and Control lines were evaluated.
- The S-14 and S-27 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 five 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-5) were evaluated. The average age at sexual maturity was 165.9 days. Egg weight at 28thweek was 39.89 g and at 40thweek was 42.60 g (Table 30). The hen housed egg production up to 40, 52 and 72 weeks of age were 45.99, 60.38 and 96.92 eggs, respectively.

S-6 generation of native chicken was produced and about 1074 good chicks obtained. The average body weight of day old and 8 weeks of native chicken was 28.20 and 254.6 g, respectively. The feed efficiency at 0-8 week was 3.28. The overall survivability percentage was 82.77 up to 0-8 weeks.

Table 30. Body weight, ASM and egg weight in native birds (S-5)

Traits	N	Mean ± SE
Body weight (g)		
8 wks	1316	384.9±2.58
20 wks	612	1268±8.17
40 wks	299	1482±17.70
52 wks	419	1531±16.75
ASM (d)	350	165.9±1.34
Egg weight (g)		
28 wks	330	39.89
40 wks	300	42.60
EP 40 wks (Nos.)		
Hen housed		45.99
Survivors'		47.03
EP 52 wks (Nos.)		
Hen housed	544	60.38
Survivors'	520	63.16
EP 72 wks (Nos.)		
Hen housed		96.92
Survivors'		108.5

Conservation and utilization of elite germplasm

Selection records

The number of sires and dams used in regeneration were 32 and 240 in PB1, 31 and 224 in PB2, respectively. The effective number of parents was 113 in PB-1 and 62 in PB-2. The rate of inbreeding was 0.001 and 0.002 in PB-1 and PB-2 populations, respectively. Summary of selection records of PB-1 and PB-2 are presented in Table 31.

Table 31. Summary of selection records

Parameters	PB-1		PB-2	
	S-13	S-14	S-26	S-27
Sires	32	32	14	31
Dams	256	240	126	224
Sires contributed	32	31	14	31
Dams contributed	244	232	119	224
Effective number	108	113	59	62
Rate of Inbreeding	0.0036	0.001	0.0092	0.002
SD for male (g)	152	148	141	142
SD for female (g)	61	58	53	55
Average selection differential (g)	88	76	71	66
Selection intensity (σ)	0.47	0.51	0.39	0.44

Incubation records

The fertility and hatchability records of PB-1, PB-2 and control populations are presented in Table 32. During the current year, a total of 920 and 850 good chicks were hatched in PB-1 and PB-2 populations, respectively. Control line was not generated. Fertility and hatchability were reduced as compared to last generation in both the parent lines. Simultaneous regeneration of control population is necessary to evaluate the parent lines.

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

Gen.	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-13	1850	88.80	1378	77.28	90.07
S-14	**1332**	**83.71**	**920**	**71.17**	**85.02**
PB-2					
S-26	843	90.15	642	77.70	86.18
S-27	**1207**	**86.33**	**850**	**71.91**	**83.30**

Mortality

The mortality in the present generation during 0 to 5 weeks was 4.02 and 2.24% in PB-1 and PB-2, respectively. Mortality during 0-5 weeks of age increased in PB-1 compared to previous generation, while decreased in PB-2 (Table 33). Mortality during 6-16 weeks and 17-40 weeks of age significantly increased in both the broiler parent lines. Proper biosecurity measures need to be taken to reduce the mortality.

Table 33. Mortality (%) for PB-1, PB-2 and control line

Gen.	0-5 wks	6-16 wks	17-40 wks
PB-1			
S-13	3.56	16.03	4.54
S-14	**4.02**	**24.80**	**28.63**
PB-2			
S-26	4.21	1.46	3.13
S-27	**2.24**	**29.36**	**19.71**

Body weight and feed efficiency

The day-old body weight recorded in PB-1 and PB-2 lines were 41.69 and 41.60 g, respectively. There was a decline in five weeks body weight in both PB-1 and PB-2 lines as compared to previous generation. In the current year, there was a decline in feed conversion efficiency in both the parent as compared to previous generation (Table 34).

Table 34. 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-13	42.72 (1378)	1124±4.74 (1329)	2.11
S-14	**41.69 (920)**	**956.2 ± 7.50 (883)**	**2.16**
	PB-2		
S-26	42.40 (642)	1097± 6.03 (615)	2.09
S-27	**41.60 (850)**	**947.2± 8.41 (831)**	**2.15**

* Figures in parenthesis indicate number of observations

Frequency distribution of 5 weeks 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)

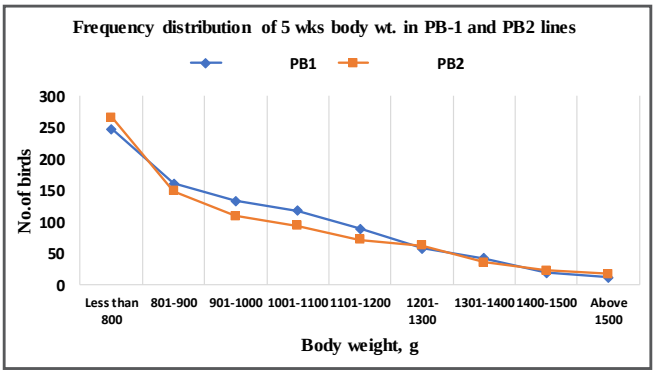


Fig 1. Frequency distribution of 5th week body weight in PB-1 and PB-2 lines

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 35, 36 and 37. The average body weight at 20 weeks recorded in PB-1 (S-14) was 2020±30.94 g. Corresponding values in PB-2 (S-27) was 2080±28.23 g, respectively. The body weight at 20 weeks of age decreased in both the lines in the present generation.

Table 35. Adult body weight at 20 and 40wks of females in different lines

Gen.	Body weight (g)	
	20 wks	40 wks
PB-1		
S-12	2236± 19.41 (515)	2861± 26.92 (244)
S-13	2465± 18.45 (353)	3103± 23.64 (244)
S-14	**2020± 30.94 (223)**	**NC**
PB-2		
S-25	2489± 40.99 (221)	3488± 36.38 (109)
S-26	2328 ± 20.05 (243)	3237 ± 18.18 (233)
S-27	**2080±28.23 (192)**	**NC**
Control		
S-25	1720± 44.95 (42)	3100± 79.90 (34)

* Figures in parenthesis indicate number of observations

The ASM recorded in S-13 of PB-1 and S-26 of PB-2 and control lines were 193.32 and 198.97 days, respectively. Increase of ASM was observed in both PB-1 and PB-2 line. There is reduction in weight of egg at 32 weeks of age in both the parent lines compared to previous generation.

Table 36. Age at sexual maturity and egg weights in different lines

Gen.	ASM (days)	Egg wt (g) at 32 wks	Egg wt (g) at 40 wks
PB-1			
S-12	191.43± 0.88 (221)	58.77±0.50 (150)	60.80±0.44 (120)
S-13	**193.32± 0.58 (238)**	**55.20± 0.30 (220)**	**61.78±0.37 (100)**
PB-2			
S-25	187.37±0.56 (126)	57.52±0.47 (85)	60.61±0.57 (100)
S-26	**198.97±0.74 (231)**	**54.92±0.29 (100)**	**62.97±0.43 (100)**
Control			
S-25	NR	54.63±0.91 (30)	56.03±1.03 (30)

* Figures in parenthesis indicate number of observations

The average egg production at 40 weeks of age (survivor basis) in PB-1 and PB-2 lines in the latest generation were 43.59 and 28.38 eggs, respectively. Corresponding production at 52 weeks of age were 65.51 and 65.82 eggs, respectively. The egg production up to 40 and 52 weeks of age decreased in all two parent lines. The centre reported that the egg production is significantly declined, as during Corona lock out period the birds were provided with only maintenance ration to reduce the production as there was no demand for chicks.

Table 37. Production performance of females

Gen.	Egg production (Nos.)	
	40 wks	52 wks
PB-1		
S-12	54.52±0.88 (240)	95.02 (237)
S-13	**43.59±0.77 (244)**	**65.51±0.81 (240)**
PB-2		
S-25	43.00 (119)	104.12 (96)
S-26	**28.38±0.60 (233)**	**65.82±0.59 (224)**
Control		
S-25	47.52 (34)	99.82 (14)

* Figures in parenthesis indicate number of observations

Response

The average phenotypic and genetic response of 5 weeks body weight in PB-1 was 9.74 (14 generations) and 30.68 g (12 generations), respectively (Fig. 2 and 4). Corresponding values for egg production up to 40 weeks of age in PB-1 was -1.2 (14 generations) and -1.2 eggs (13 generations). The average phenotypic and genetic response of 5 weeks body weight in PB-2 was 5.70 (16 generations) and 19.45 g (14 generations), respectively (Fig. 3 and 5). Corresponding values for egg production in PB-2 up to 40 weeks was -1.7 (15 generations) and -1.3 eggs (14 generations).

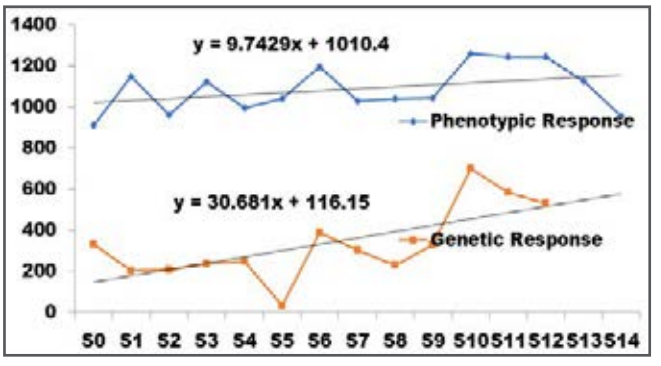


Fig 2. Genetic and phenotypic response to 5 weeks body weight in PB-1

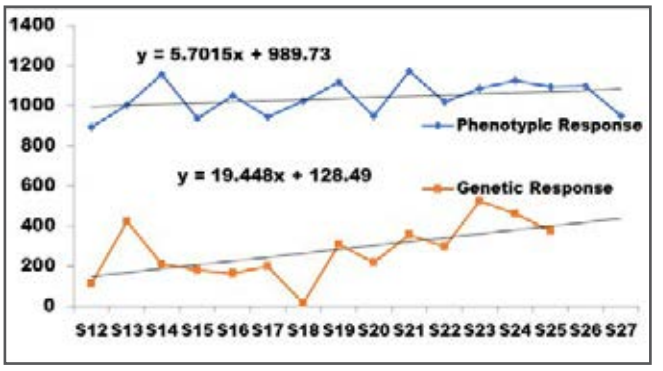


Fig 3. Genetic and phenotypic response to 5 weeks body weight in PB-2

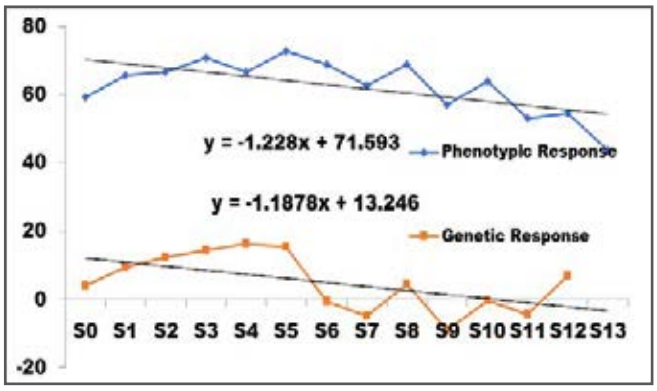


Fig 4. Genetic and phenotypic response of egg production up to 40 wks in PB-1

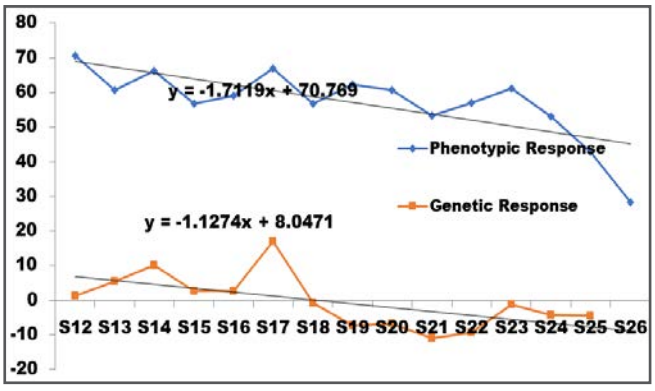


Fig 5. Genetic and phenotypic response of egg production up to 40 wks in PB-2

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

PB-1 x PB-2 cross (Raja –II) was evaluated under field condition. A total of 200 Raja II chicks were reared under intensive management. The body weight at 6 and 7 weeks was 1550 and 1950 g with 2.16 FCR (up to 7 weeks) and 98 % survivability. The farmer got a net profit of Rs. 8,471 by rearing a unit 200 Raja-II birds.

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

No. of chicks reared: 200

Average 6th week body weight : 1.55 kg

Average 7th week body weight : 1.95 kg

FCR : 2.16

Survivability : 98.00%

1. Expenditure

Cost of chick 200 X Rs.16 = 3,200.00

Cost of feed (approx) up to 6 weeks 196 birds X 3.10kg feed X Rs.30 = 18,228.00

Other expenditure 200 birds X Rs.10 = 2,0500.00

Total Expenditure = 23,428.00

2. Income

196 birds X 1.55kg X Rs.105 = Rs.31,899.00

Profit (approx) 31,899- 23,428 =**Rs 8,471.00**

Activities undertaken under DAPSC/ SCSP Program

A total of 2240 eight weeks old grownup chicks were distributed to 150 Scheduled caste farmers and landless labourers of different villages of Maddur Taluk (Mandya district) and Doddaballapura Taluk (Bengaluru rural district). Each farmer was distributed with 10-17 chicks, a waterer, a feeder and 15 kgs of feed.

Germplasm supply

A total of 1,66,837 Nos. germplasm (1,56,442 day old chicks and 10,395 hatching eggs) were supplied to farmers and other stakeholders (325 farmers) during the current year.

Revenue generation

The centre generated revenue of Rs. 46.67 lakhs which was 118% of expenditure on feed cost (Rs. 39.59 lakhs).

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

Activities assigned

- Evaluation of *Punjab Brown* germplasm.
- 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-6 generation of *Punjab Brown* chicken germplasm.
- PB-2 X Local native chicken cross evaluated.
- The centre regenerated S-14 generation of PB-1 and S-46 generation of PB-2 population.

Achievements

Evaluation of native germplasm

A total of 1520 fertile eggs of *Punjab Brown* were set for hatching in S-6 generation. S-6 generation was were reproduced utilising 50 sires and 150 dams. The fertility was 93.49%. The hatchability percent on TES and FES were 98.10 and 91.71, respectively. The body weight of *Punjab Brown* chicks at 4 and 8 weeks of age were 329.6, 669.1 g in males and 314.3, 594.6 g in females, respectively (Table 38). The mortality percent in native chicken in different age groups of 0-8, 9-20, 21-40 were 4.55, 2.76 and 3.02, respectively. ASM of *Punjab Brown* was 170.36 days and egg production up to 36 weeks was 52.16 eggs. Egg weight at 36 weeks of age was 50.11 g. Egg production up to 52 weeks of age was 100.31 eggs. The heritability estimates for body weight at 8 weeks, 20 weeks, ASM and 40 weeks egg production were 0.27, 0.36, 0.22 and 0.27, respectively based on the half sib analysis.

Farm evaluation of dual cross (PB-2 x Native) was completed. The body weight of cross at 4, 8, 16 and 20 weeks of age were 371.3, 840.6, 1800 and 2044 g, respectively. The mortality percent in dual purpose cross in different age groups of 0-8, 9-20, 21-40 were 5.33, 2.82 and 0.72, respectively in farm. ASM and egg production up to 36 weeks in was 172 days and 60.24 eggs, respectively. Egg weight at 36 weeks of age was 53.44 g. Egg production up to 52 weeks of age was 173 eggs.

Table 38. Comparative performance of *Punjab Brown* (S-6) and its cross with PB-2

Traits	*Punjab Brown* (Male)		*Punjab Brown* (Female)		Dual-purpose cross PB2 (M) x *Punjab Brown* (F) in Farm	
	N	Mean±SE	N	Mean ± SE	N	Mean
Body weight (g)						
4 wks	110	329.6±6.45	250	314.3±5.16	100	371.3
8 wks	100	669.1±4.83	249	594.6±9.78	100	840.6
16 wks	100	1541±7.06	240	1409±8.63	95	1800
20 wks	100	2137±14.7	240	1794±8.16	95	2044
36 wks	95	3014±5.88	235	2594±15.6	80	2879*
52 wks	95	3702±15.6	200	3164±21.3	-	-
FCR (0-8 wks)	-	3.9 (M+F)			-	3.55
ASM (d)	-	-	240	170.36±0.65	45	172
EW at 36 wks (g)	-	-	127	50.11±11.13	45	53.44
EP 36 wks (Nos)	-	-	200	52.16±11.23	45	60.24
EP 52 wks (Nos)			200	100.31±12.15	40	173

*BW at 40wks

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 39. The PB-1 and PB-2 populations were reproduced utilizing 70 sires and 350 dams during S-14 and 70 sires and 350 dams during S-46 generations, respectively. There is reduction in the selection differential during this generation compared to previous generation in PB-1 line.

Table 39. Summary of selection records in last two generations in PB-1 and PB-2

Parameters	PB-1		PB-2	
	S-13	S-14	S-45	S-46
Sires	70	70	60	70
Dams	350	350	300	350
Sires contributed	70	70	60	70
Dams contributed	350	350	300	350
Effective number	233.33	233.33	200.00	233.33
Rate of inbreeding	0.0021	0.0021	0.0025	0.0021
Average Expected selection differential	128.63	91.32	27.05	41.78
Expected response	21.87	15.52	6.11	7.10

Incubation Records

During the current generation, a total of 3142, 3333 and 169 good chicks were hatched in PB-1, PB-2 and Control populations, respectively (Table 40). The fertility was 93.79, 93.95 and 88.73% in PB-1, PB-2 and control lines. The hatchability on total eggs set was 93.65, 97.01 and 93.37 in PB-1, PB-2 and control lines, respectively. The hatchability slightly reduced in PB-1 line and improved in PB-2 line as compared to last generation.

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

Gen./ year	Eggs set (Nos.)	(%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-13	3848	94.65	3469	95.41	90.31
S-14	**3577**	**93.79**	**3142**	**93.65**	**87.74**
PB-2					
S-45	3183	94.75	2798	92.94	88.06
S-46	**3667**	**93.95**	**3333**	**97.01**	**91.14**
Control					
2020-21	341	96.48	310	94.83	91.50
2021-22	**204**	**88.73**	**169**	**93.37**	**82.84**

Mortality

The mortality reported in PB-1, PB-2 and control lines were 6.08, 5.10 and 5.88%, respectively during 0-5 week (Table 41). During grower period mortality of 5.46, 4.93 and 4.71% was recorded in PB-1, PB-2 and control, respectively.

Table 41. 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-13	4.73	4.93	3.12
S-14	**6.08**	**5.46**	**3.05**
PB-2			
S-45	5.49	4.81	3.36
S-46	**5.10**	**4.93**	**2.80**
Control			
2020-21	4.52	3.40	2.74
2021-22	**5.88**	**4.71**	**4.32**

Body weight

During current generation the average body weight at 5 weeks of age was 1241, 1152 and 968.4 g in PB-1, PB-2 and Control lines, respectively (Table 42). The feed efficiency up to 5 weeks of age was maintained in all the three lines. The body weight at 5 weeks of age increased in all PB-1, PB-2 and control lines as compared to previous generation.

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

Gen./year	BW 5 wks	Feed efficiency (up to 5 wks)
PB-1		
S-13	1202±4.13 (1480)	1.87
S-14	**1241±3.37 (1510)**	**1.88**
PB-2		
S-45	1000±9.98 (1306)	1.89
S-46	**1152±5.54 (1452)**	**1.89**
Control		
2020-21	921.6±7.76 (251)	1.91
2021-22	**968.4±8.19 (192)**	**1.90**

Frequency distribution of 5 weeks body weight

Frequency distribution of 5 weeks 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 2000 g. Similarly, in PB-2 range was from 100 to 2000 g.

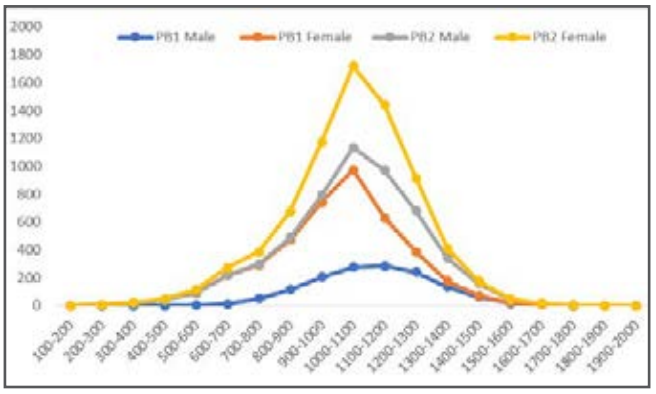


Fig. 6. Frequency distribution of 5 wks BW in PB-1 male and female lines and PB-2 male and female lines.

Production traits

The production traits were recorded up to 52 weeks of age in PB-1, PB-2 and control lines. The body weight of PB-1 and PB-2 lines at 20 weeks of age (Table 43) 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 43. Adult body weight in PB-2, PB-1 and control lines

Gen./ year	Body weight (g)	
	20 wks	40 wks
PB-1		
S-13	2357±12.94 (471)	3065±10.86 (397)
S-14	**2385±10.14 (456)**	**3096±6.86 (415)**
PB-2		
S-45	2287±27.96 (375)	2974±28.18 (351)
S-46	**2299.32±14.15 (428)**	**3013±2.95 (421)**
Control		
2020-21	2193±18.28 (151)	2903±17.10 (136)
2021-22	**2211±8.88 (115)**	**2946±12.56 (115)**

The age at sexual maturity decreased in PB-1 and increased in PB-2 lines as compared to previous generation (Table 44). The egg weight at 40 weeks of age were recorded as 55.07, 56.09 and 54.26 g, respectively in PB-1, PB-2 and control lines. Egg weight at 52 weeks slightly increased in all three lines. There was increase in the egg production up to 40 weeks and 52 weeks of age in PB-1, PB-2 and control lines as compared to last generation (Table 45).

Table 44. ASM and egg weights performance at different ages

Gen./year	ASM (d)	Egg weight (g)	
		40 wks	52 wks
PB-1			
S-13	179.2±0.46 (465)	54.41±0.34 (310)	63.12±0.27 (222)
S-14	**176.0±1.13 (456)**	**55.07±0.17 (250)**	**64.51±1.26 (221)**
PB-2			
S-45	170.3±2.26 (361)	54.03±2.23 (176)	63.98±11.7 (137)
S-46	**173.7±1.66 (428)**	**56.09±0.31 (254)**	**65.66±10.1 (185)**
Control			
2020-21	178.3±28.0 (157)	52.69 ±1.39 (125)	61.34±0.65 (110)
2021-22	**179.1±18.1 (157)**	**54.26±0.65 (102)**	**62.73±8.09 (98)**

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

Gen./year	Egg production (Nos.)	
	40 wks	52 wks
	PB-1	
S-13	53.27±0.49 (420)	111±0.73 (369)
S-14	**55.02±0.99 (422)**	**115.6±1.26 (285)**
	PB-2	
S-45	55.27±4.56 (349)	117.8±17.2 (298)
S-46	**56.13±5.56 (415)**	**118.3±10.4 (265)**
	Control	
2020-21	50.12±5.23 (136)	98.16±4.51 (135)
2021-22	**51.22±6.33 (110)**	**100.6±9.84 (105)**

Egg quality traits

The egg quality traits measured at 36 weeks of age in PB-1, PB-2 and control lines were presented in Table 46.

Table 46. 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)	55.07±0.17	56.09±0.31	54.26±0.65
Egg length (cm)	5.60±0.14	5.71±0.23	5.32±0.05
Egg width (cm)	4.64±0.05	4.37±0.26	4.24±0.09
Shape index	82.86±0.39	76.56±0.47	79.70±0.49
Shell thickness (mm)	37.41±0.26	37.51±0.36	38.01 ±0.43
Albumen height (mm)	8.16±0.45	8.34±0.23	8.04±0.21
Yolk height (mm)	16.43±0.23	16.47±0.21	16.69±0.19
Yolk diameter (mm)	3.78±0.16	3.90±0.16	3.84±0.18
Yolk index	4.35	4.22	4.35
Haugh unit[2]	91.17	92.12	90.53

Genetic parameters

The heritability estimates for five weeks body weight, ASM and 40 weeks egg production in PB-2 line were 0.11, 0.15 and 0.12, respectively based on the half sib analysis.

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 -0.79 and 4.88 g for 5 weeks body weight and -2.01 eggs and -0.23 eggs for 40 weeks egg production, respectively in PB-2 population over last 15 generations. The phenotypic and genetic response for 5 weeks body weight was 7.09 and 12.71 g, respectively in PB-1 over last 15 generations. The phenotypic response of egg production up to 40 weeks of age was -1.14 eggs and genetic response was 0.71 egg over 14 generations.

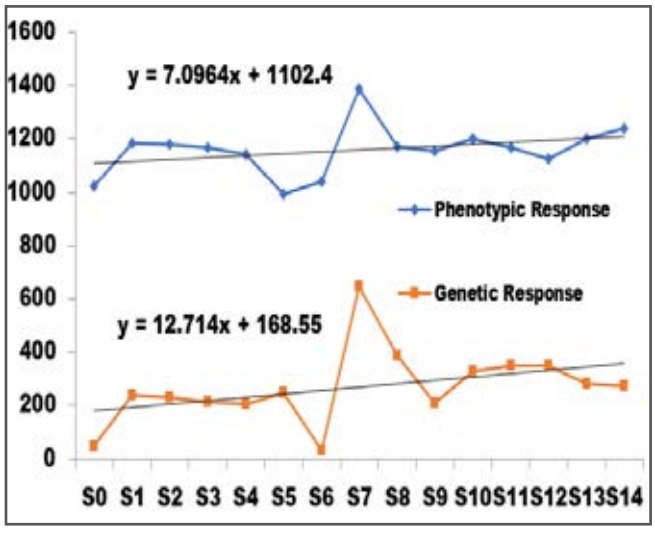


Fig. 7 Genetic and phenotypic response to 5 week body weight in PB-1 at Ludhiana

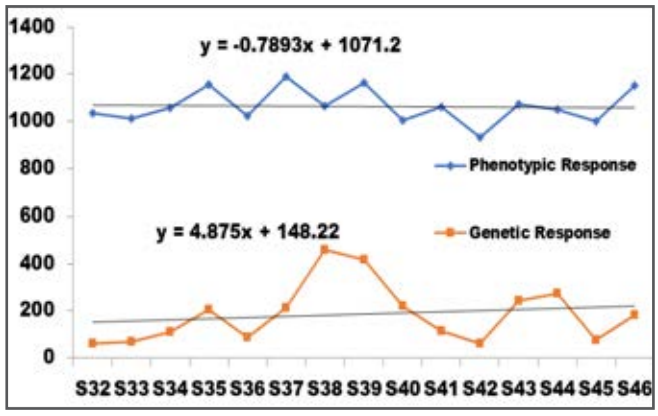


Fig. 8. Genetic and phenotypic response to 5 week body weight in PB-2 at Ludhiana

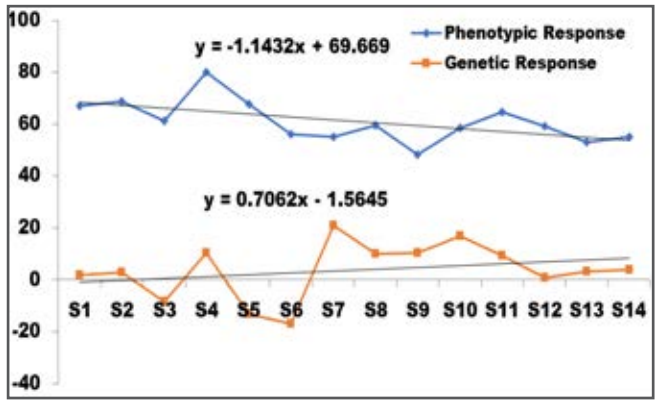


Fig. 9. Genetic and phenotypic response to EP 40 wks in PB-1 at Ludhiana

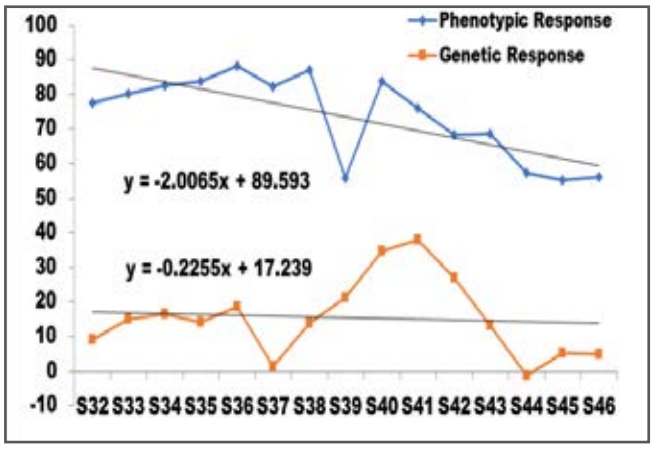


Fig. 10. Genetic and phenotypic response to EP 40 wks in PB-2 at Ludhiana

Evaluation of IBL-80

A total of 90 day old chicks of IBL-80 (PB-1x PB-2) birds were reared on intensive farming. The net profit was Rs.36.98 per bird.

Average body weight (g) per bird	: 1,654
Total feed consumed per bird (g)	: 3,110
Cost of feed @ Rs.28 per Kg	: 87.07
Receipts (sold at Rs.75/kg live wt.	: 124.05
Profit per bird (Rs.)	: 36.98

Implementation of DAPSC/SCSP

A total of 70 SC beneficiaries were identified and provided with 4-weeks old chicks. The feedback is being collected and several beneficiaries have sold the birds at 600 to 800 rupees after rearing them for a month at their back yard. The SC beneficiaries have reported that the scheme has helped them for additional income and also motivated them towards backyard poultry farming

Germplasm supply

A total of 85,999 Nos. germplasm were distributed to 444 farmers.

Revenue generation

The centre generated the revenue of Rs. 28.36 lakhs which was 118 % of expenditure on feed (Rs. 24.00 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 lines.
- To maintain a control population simultaneously to measure the genetic trends.

Action taken

- Regenerated (Pedigreed hatching) and evaluated local native chicken line.
- Regenerated and evaluated the 19th generation of CSML and CSFL lines.
- Production and evaluation of F1 (CSML x local native) x CSFL cross.

Achievements

Evaluation of native germplasm

During the year, S-6 generation of the native chicks was evaluated for growth and confirmatory traits. Mass Selection for higher 16 weeks body weight and mild culling based on egg production in 40 weeks was practiced. A total of 1280 good chicks were hatched in S-6 generation with fertility, hatchability on TES and on FES of 84.52, 76.79 and 90.85%, respectively. The body weight, breast angle, shank length and keel length of native chicken at 16 weeks of age was 1095g, 34.03, 7.68 cm, 9.55 cm in female and 1468g, 37.50, 8.74 cm, 10.23 cm in male, respectively.

Evaluation of dual-purpose cross

The process of developing dual purpose backyard cross continued. A total of 2432 good chicks of F1 x CSFL was obtained with fertility of 71.40% and hatchability on TES and FES of 49.21 and 68.93%, respectively. Farm and field evaluation of the F1 x CSFL was done (Table 47). Body weight at day old, 1, 2, 3, 4, 6 and 20 weeks of age in the dual-purpose cross was 36.62, 157.5, 245.3, 419.9, 643.7, 917.5, 1154 and 2818 g, respectively in the farm evaluation. In the farmers field the body weight at 6 weeks of age was ranged between 641.6 and 939.6 g. Carcass characteristics of F1 x CSFL cross was evaluated at 12 weeks of age. Live weight at 12 weeks was 2354 g. Carcass, dressed, breast, wings, drumstick, thigh, back and neck weights were 1938, 1687, 371.8, 156.5, 223.9, 209.8, 308.3 and 53.4 g, respectively. The abdominal fat was 13.23.

Table 47. Body weight of dual-purpose cross (F1 x CSFL) in farm and filed

Trait	Farm (N=250)	Farmer-1 (N=250)	Farmer-2 (N=250)	Farmer-3 (N=250)
Body wt. (g)				
day old	36.62±0.13			
1 wk	157.5±0.78			
2 wks	245.3±2.49	171.8±1.47	202.1± 1.92	182.5±1.86
3 wks	419.9±4.12	244.3±2.17	371.4± 3.38	320.4±3.77
4 wks	643.7±6.80	377.3±3.79	641.8± 5.79	460.5±5.76
5 wks	917.5±9.27	572.2±6.12	808.4± 7.95	595.8±7.74
6 wks	1154±11.50	641.6±7.34	939.6±8.64	695.4±8.82
20 wks	2818 ± 41.54	-	-	-

Conservation and utilization of elite germplasm

The mating plan of SML, CSML and control were finalized and regeneration of these lines was completed. CSML and CSFL has reached 19th generation of selection based on body weight at 5 weeks of age.

Incubation information

The incubation records for the CSML, CSFL and the control lines over last two generations were presented in Table 48. A total of 4926, 5434 and 1053 eggs were set in CSML, CSFL and control lines and out of which 3163, 3518 and 795 good chicks were obtained. The fertility remained above 82% in both the selected and control populations. There is reduction in hatchability (TES) in both CSML and CSFL lines.

Table 48. Summary of incubation and hatching results during last two generations

Gen.	Eggs set (Nos.)	Fertility (%)	Good Chicks (Nos.)	Hatchability (%)	
				TES	FES
CSML					
2020-21 (S-18)	3094	69.29	1490	85.23	72.15
2021-22 (S-19)	**4926**	**72.39**	**3163**	**64.84**	**89.57**
CSFL					
2020-21 (S-18)	2953	66.00	1547	78.68	88.95
2021-22 (S-19)	**5434**	**72.91**	**3518**	**65.61**	**89.98**
Control					
2020-21 (S-18)	1342	74.44	775	57.68	77.48
2021-22 (S-19)	**1053**	**72.52**	**795**	**76.54**	**91.59**

Body weights

The body weight at 5 weeks of age recorded in CSML, CSFL and control lines over last two generations is

presented in Table 49. The body weight at 5 weeks of age in CSML, CSFL and control lines recorded in the year 2021-22 (S-19) were 1243, 1262 and 838.9 g, respectively. The body at 5 weeks increased in CSML and CSFL as compared to previous generation.

Table 49. Body weight and FCR at 5 weeks during the last two generations

Gen.	Body wt. 5 wks (g)
CSML	
2020-21 (S-18)	1198 ±4.07
2021-22 (S-19)	**1243±3.11**
CSFL	
2020-21 (S-18)	1012±11.03
2021-22 (S-19)	**1262±3.17**
Control line	
2020-21 (S-18)	-
2021-22 (S-19)	**838.9±8.97**

Response

Phonotypic and Genetic response in CSML and CSFL for body weight at 5 weeks was presented in Fig-11 and 12. The phenotypic response per generation was 10.36 and 7.35 g in CSML and CSFL, respectively over last 15 generations. The genetic response was 9.89 and 10.74 g, respectively, in CSML and CSFL lines in last 13 generations.

Germplasm supply

A total 46,981 germplasm (20809 fertile eggs, 23,823 day old chicks and 2349 grownup birds) were supplied to the 46 farmers and other stakeholders across 7 states. A total of 5410 germplasm was supplied to ICAR-IVRI and ICAR-CARI for research purpose.

Revenue generation: NA

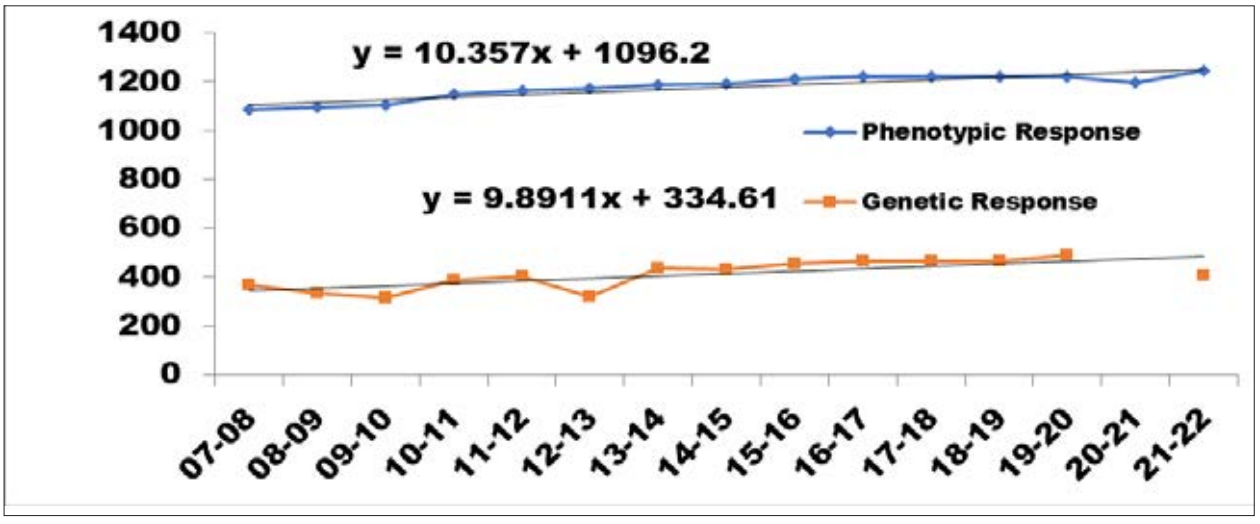


Fig 11. Genetic and phenotypic response to 5 wk body weight in CSML at Izatnagar

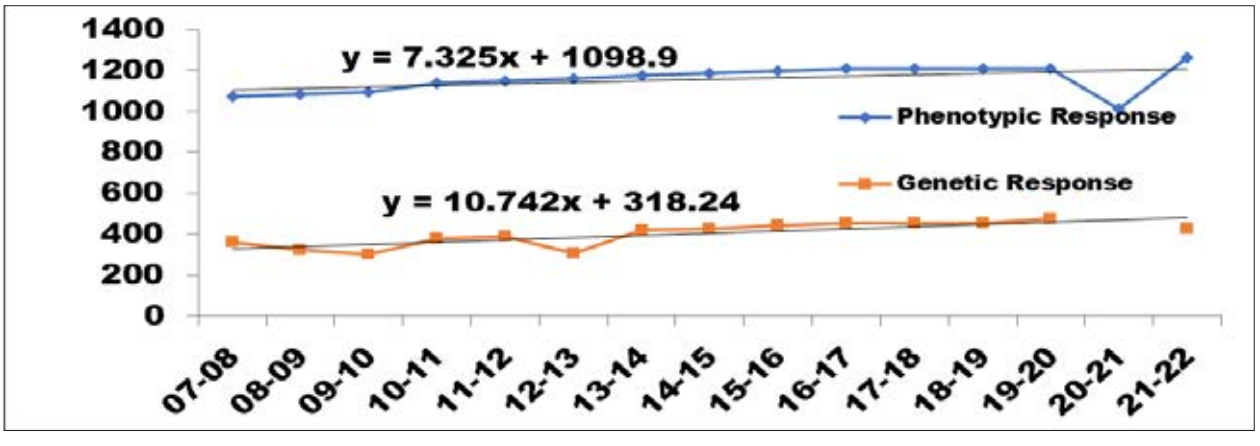


Fig 12. Genetic and phenotypic response to 5 wk body weight in CSFL at Izatnagar

Odisha University of Agriculture and Technology, Bhubaneswar (Odisha)

Activities assigned

- Evaluation of local native chicken (*Hansli*) germplasm.
- Establishment and evaluation of 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 juvenile traits in S-0 generation.
- Procured hatching eggs of CSML and CSFL hatching eggs from ICAR-CARI, Izatnagar

Achievements

Collection, Conservation and Evaluation of native germplasm

A total of 161 good chicks of S-0 generation of *Hansli* chicken were hatched and average body weight at day old was 30.22 g. Body weight at 8 and 20 weeks of age was 449.6 and 1535 g, respectively. Mortality during 0-8 and 9-20 weeks were 4.36 and 2.11%, respectively (Table 50). Preliminary studies on phenotypic characterization and production traits of native *Vezaguda* and *Phulbani* chickens have been carried out.

Table 50. Performance of *Hansli*

Traits	S-0
Body weight (g)	
Day old	30.22± 0.28 (161)
8 wks	449.6± 9.75 (72)
20 wks	1535±22.2 (61)
FCR (8 wks)	4.49
Body conformation traits	
Breast Angle (°)	43.09±0.37
Shank Length (cm)	7.47±0.08
Keel Length (cm)	7.12±0.05
Mortality (%)	
0-8 wks	4.36
9-20 wks	2.11

Conservation and utilization of elite germplasm

Establishment of CMSL and CSFL lines

The centre has procured 900 CSML hatching eggs and 900 CSFL hatching eggs from CARI, Izatnagar.

Germplasm supply: Nil

Revenue Generation: Nil

ICAR Research Complex for NEH Region, Tripura Centre, Agartala

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 the *Tripura Black*, *Dahlem Red*, Coloured broiler dam line (CSFL), BN cross and BND cross.
- Three-way cross was evaluated in E-5 generation up to 72 weeks of age and E-6 generation up to 52 weeks of age.
- Performance of dual-purpose (BND) cross was evaluated at institute farm as well as the farmers' field.

Achievements

During the period under report, the centre hatched 4114 good chicks of *Tripura Black* were evaluated up to 20 weeks of age. *Dahlem Red* was evaluated up to 40 weeks of age, whereas Coloured broiler dam line (CSFL) and BN cross were evaluated up to 52 weeks of age at farm. The body weight at 40 weeks was 1965, 3089 and 1911 gm in *Dahlem Red*, Coloured broiler dam line and BN cross, respectively. E-5 evaluation of BND cross, the recorded 72 weeks egg production was 166.48 eggs under farm and 91.45 up to 52 weeks under field conditions. E-6 evaluation of BND cross was completed up to the 52 weeks of age at farm and 40 weeks of age at field condition. During E-6 evaluation of BND cross, the 40 weeks egg production was 66.16 and 53.22 eggs under farm and field conditions, respectively.

Incubation information

A total of 33,325 chicks of different varieties / lines of chicken were produced. The overall average fertility was 84.94% in different breeds/varieties/ lines of chicken. The fertility ranged from 77.61 to 86.11%. The fertility improved in *Dahlem Red* and BND cross as compared to previous generations. The overall average hatchability on fertile egg set (FES) and total egg set (TES) were 74.31 and 63.12%, respectively. The hatchability on TES (56.69 to 65.38%) improved in *Dahlem Red* and BND cross populations as compared to previous generations, whereas in *Tripura Black*, Coloured broiler dam line (CSFL) and BN cross populations it has reduced. The hatchability on FES (65.83 to 77.52%) reduced in all populations as compared to previous generation. The highest hatchability on FES and TES was found in BN (77.52%) and BND cross (65.38%), respectively. The lowest hatchability on FES (65.83%) and TES (56.69%) was found in *Dahlem Red* (Table 51).

Mortality

The mortality during brooding period was lowest in *Tripura Black* (3.66%) and highest in *Dahlem Red* (7.62%). Mortality during growing period ranged from 2.71 to 11.82% and during laying period it ranged from 0.22 to 2.66% (Table 52).

Table 51. Summary of incubation and hatching of different populations

Strains	Year	Eggs set (Nos.)	Fertile eggs (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks (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
	2020-21	15718	13346	84.91	72.30	85.15	11364
	2021-22	**2041**	**1584**	**77.61**	**59.28**	**76.39**	**1210**
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
	2020-21	4409	3858	87.50	69.27	79.16	3054
	2021-22	**1826**	**1569**	**85.93**	**62.43**	**72.66**	**1140**
Dahlem Red	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
	2020-21	4998	3898	77.99	51.84	66.47	2591
	2021-22	**9806**	**8444**	**86.11**	**56.69**	**65.83**	**5559**
BN cross (50%)	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
	2020-21	3028	2482	81.97	69.55	84.85	2106
	2021-22	**5330**	**4283**	**80.36**	**62.29**	**77.52**	**3320**
BND cross (Dual type)	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
	2020-21	26038	21940	84.26	66.79	79.27	17392
	2021-22	**33794**	**28965**	**85.71**	**65.38**	**76.29**	**22096**

Table 52. 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
	2020-21	1.681	5.782	1.520	4.716
	2021-22	**3.66**	**5.83**	**-**	**2.57**
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
	2020-21	6.201	6.951	1.565	1.759
	2021-22	**7.62**	**11.82**	**1.06**	**0.97**
CSFL	2018-19	3.88	18.11	1.99	2.23
	2019-20	4.60	8.30	2.35	2.90
	2020-21	2.085	2.156	0.705	0
	2021-22	**6.40**	**9.46**	**0.76**	**0.22**
BN cross (50%)	2017-18	5.90	9.55	4.80	5.10
	2018-19	6.85	-	-	-
	2019-20	6.39	9.42	0.84	2.30
	2020-21	3.259	19.061	0.823	1.771
	2021-22	**6.03**	**2.71**	**1.70**	**1.52**
BND cross (Dual type)	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
	2020-21	6.386	5.855	0.099	1.612
	2021-22	**7.56**	**9.52**	**1.67**	**2.66**

Performance of pure lines

The performance of *Tripura Black* was evaluated up to 20 weeks of age. *Dahlem Red* was evaluated up to 40 weeks of age, whereas Coloured broiler dam line (CSFL) and BN cross were evaluated up to 52 weeks of age at farm. The body weight of female birds at 40 weeks was 1714 and 2673 g in *Dahlem Red*, and Coloured broiler dam line respectively which was more than *Dahlem Red*, and less than Coloured broiler of previous generation. The pooled body weight at 40 weeks was 1965 and 3089 g in *Dahlem Red* and Coloured broiler dam line, respectively which was also more than *Dahlem Red* and less than Coloured broiler of previous generation. ASM was less in *Dahlem Red* and more in Coloured broiler as compared to the previous generation. In case of *Tripura Black*, the body weight of female and pooled sex at 20 weeks was 1137 and 1280g, respectively which was higher to the previous generation. The egg production up to 40 and 52 weeks of age showed slightly reduction in Coloured broiler dam line but egg production was slightly improved in *Dahlem Red* up to 40 weeks of age in comparison to previous generation. The average egg weight at 40 weeks of age was 58.85 and 59.49 g in *Dahlem Red* and Coloured broiler population, respectively. The egg weight for *Dahlem Red* was higher as compared to the previous generation (Table 53).

Table 53. Performance of different pure lines

Traits	N	*Tripura Black*		N	*Dahlem Red*		N	CSFL*	
		2021-22	2020-21		2021-22	2020-21		2021-22	2020-21
Body weight (g)									
Day old	111	**29.23±0.28**	30.59±0.01	178	**34.20±0.21**	37.24±0.19	115	**42.67±0.35**	42.76±0.48
4 wks	87	**141±3.01**	130±0.11	161	**138.4±2.56**	140.5±2.0	107	**325±7.2**	321.7±10.5
8 wks	68	**298±6.86**	287±4.6	147	**481.9±10.6**	340.9±5.2	104	**710.9±14.1**	703.2±19.4
12 wks	48	**548±13.3**	556±10.7	131	**850±25.0**	616.6±6.59	100	**1404±30.0**	1404±40.9
20 wks**, Female**	16	**1137±33.9**	983±23.5	81	**1298±25.4**	1109±18.3	42	**2528±27.8**	2779±39.4
20 wks, Pooled sex	29	**1280±41.9**	1114±24.4	128	**1483±31.3**	1250±20.1	98	**2781±41.4**	2936±59.5
40 wks, **Female**		-	1318±31.4	76	**1714±26.7**	1464±31.7	40	**2673±30.4**	2801±48.5
40 wks, Pooled sex		-	1540±31.5	119	**1965±38.9**	1732±38.5	82	**3089±51.6**	3169±10.0
AFE in the flock (d)		-	154	82	**122**	153	42	**154**	147
ASM (d)		-	181	78	**160**	165	42	**182**	179
EP 40 wks (Nos.)									
HH		-	49.12	81	**73.40**	71.07	42	**56.97**	64.60
HD		-	52.74		**74.36**	72.21		**57.63**	64.78
Survivors'		-	53.21	78	**76.22**	74.63	40	**59.83**	66.02
EP 52 wks (Nos.)									
HH		-	69.98		**-**	-	42	**75.86**	80.07
HD		-	79.30		**-**	-		**81.47**	85.94
Survivors'		-	79.98		**-**	-	38	**83.84**	87.85
EW 40 wks (g)		-	46.17±0.63	33	**58.85±0.60**	56.50±0.67	39	**59.49±0.55**	64.70±0.66

*CSFL: Coloured Broiler Dam line

Performance of BN cross

The performance of BN cross populations was evaluated up to 52 weeks of age. The body weight at 20 weeks was 1622 g, which was almost higher than the previous generation and body weight at 40 weeks was also slightly higher as compared to previous generation. The egg production up to 40 and 52 weeks of age decreased as comparison to previous generation. The egg weight at 40 weeks was 51.38 g, which has increased as compared to the previous generation (Table 54).

Performance of three way cross (BND Cross)

In E-5 evaluation, the 72 weeks egg production of BND cross was 166.48 eggs under farm and 91.45 eggs up to 52 weeks at farmers' fields. E-6 evaluation of BND cross was completed up to 52 weeks under farm and up to 40 weeks of age under field conditions. During E-6 evaluation, the 40 weeks egg production of BND cross was 66.16 and 53.22 eggs under farm and field conditions, respectively. The body weight recorded in E-6 at 20 and 40 weeks of age showed slight reduction in comparison to previous (E-5) evaluation under farm. The age at sexual maturity was almost similar to previous (E-5) evaluation under farm and field. The 40 weeks egg weight of BND cross at farm and field conditions has increased as compared to the previous evaluation (Table 55).

Germplasm supply

A total of sixteen training programmes on backyard poultry farming for rural farmers were organized in which about 600 rural farmers were trained on all aspects of poultry farming. A total of 28,561 germplasm was supplied to 738 farmers during the reporting period.

Revenue generation

The centre realized overall receipt of Rs.12.24 lakhs which was 68.08% of the expenditure on feed cost (Rs. 17.98 lakhs).

Table 54. Performance of BN cross

Traits	N	2021-22	2020-21
Body weight (g)			
Day old	117	34.77±0.28	33.71±0.23
4 wks	108	233±6.22	153±4.08
8 wks	104	726±14.5	444±1.55
12 wks	59	1236±29.6	897±23.4
20 wks, Females	33	1611±53.5	1452±48.5
20 wks, Pooled sex	56	1796±48.8	1565±39.1
40 wks, Females	29	1834±52.9	1632±82.3
40 wks, Pooled sex	47	1911±39.6	1820±60.6
AFE in the flock (d)	33	130	120
ASM (d)	32	162	160
EP 40 wks (Nos.)			
HH	33	42.70	47.46
HD		46.72	53.97
Survivors'	29	48.59	55.83
EP 52 wks (Nos.)			
HH	33	64.03	67.67
HD		72.86	86.88
Survivors'	28	75.46	87.00
EW 40 wks (g)	32	51.38±0.73	48.35±0.45

Table 55. Performance of BND cross

Traits	BND cross (E-6)				BND cross (E-5)	
Body weight (g)	**N**	**Farm**	**N**	**Field**	**Farm**	**Field**
Day old	380	35.01±0.14	-	-	34.07±0.24	-
4 wks	367	168.2±1.63	526	160.6±1.88	167.7±3.71	157.2±8.96
8 wks	351	453.8±4.42	511	326.4±4.66	378.8±7.49	353.3±4.80
12 wks	337	760.5±5.76	351	724.9±11.6	787.1±14.1	536.5±15.8
20 wks, Pooled sex	313	1622±12.5	121	1509±37.8	1720±25.9	1364±32.4
40 wks, Females	204	1677±17.2	69	1605±28.8	1849±22.6	**1630±15.8**
40 wks, Pooled sex	303	1925±24.9	110	1872±40.0	2077±34.7	**1874±35.8**
AFE in the flock (d)	209	132	76	136.36	138	**142**
ASM (d)	206	160	74	164.32	163	**165**
Egg wt, 40 wks (g)	63	54.67±0.61	64	48.69±0.91	49.85±0.43	**46.89±0.61**
Egg production (Nos.)						
40 wks	204	66.16	69	53.22	70.50	**62.50**
52 wks	198	92.16	-	-	**104.57**	**91.45**
72 wks	-	-	-	-	**166.48**	**-**

Nanaji Deshmukh Veterinary Science University, Jabalpur (Madhya Pradesh)

Activities assigned

- Evaluation and improvement of the *Kadaknath* breed of chicken and to maintain it as a pure line.
- Evaluation of improved chicken germplasm (*Jabalpur colour*) in the local climatic conditions for development of cross.
- Evaluation of terminal cross (*Narmadanidhi*) in different agroclimatic conditions.
- Conducting training programme for farmers under DAPSC and STC components of the project and supply of chicks to the farmers.

Action taken

- The centre maintained *Kadaknath*, *Jabalpur colour* and *Kadaknath* cross populations.
- During the current year centre evaluated G-1 generation of *Kadaknath* and *Jabalpur colour* population from 20 weeks onwards up to 72 weeks age. The G-2 population was produced and evaluated up to 6 weeks age.
- The *Narmadanidhi* population was evaluated under farm and field conditions up to 52 weeks age.
- Under DAPSC and STC components of the project, trainings were conducted for rural farmers and chicks were supplied round the year to the farmers.

Achievements

Jabalpur centre is working on the development and continuous improvement of suitable colour chicken variety for rural poultry production, maintaining of pure *Kadaknath* breed, supply of colour dual type chicks and conducting skill and entrepreneurship development trainings for rural and tribal farmers, youths and farm women under DAPSC and STC components of project. In view of the objective, this centre has developed and continuously improving a dual type colour parent line, maintained and improving the local native *Kadaknath* population under technical guidance of ICAR-DPR, Hyderabad. Utilizing crossing and back crossing of these improved lines, commercial dual-purpose colour variety (*Narmadanidhi*) was developed for rural poultry production by the centre. Centre also undertaking the development of mediocre colour broiler for rural poultry farming.

The G-1 generation of *Kadaknath* and *Jabalpur colour* populations were evaluated from 20 weeks to 72 weeks of age. *Narmadanidhi* (75% *Jabalpur colour* and 25% *Kadaknath*) birds were evaluated under farm and field conditions up to 52 weeks of age.

Selection records

The G-2 generation of *Kadaknath* and *Jabalpur colour* were reproduced from G-1 population utilizing 60 sires and 360 dams of JB colour and 36 sires and 216 dams of *Kadaknath*. The effective number and inbreeding co-efficient was 208.5 and 0.0021 for *Jabalpur colour* and 156.3 and 0.0026 for *Kadaknath*, respectively (Table 56).

Table 56. Summary of selection records of *Jabalpur colour* and *Kadaknath* (G-2 gen.)

Particulars	*Jabalpur Colour* (G-2)	*Kadaknath* (G-2)
No. of sires used	60	36
No. of dams used	360	216
No. of sires contributed	60	36
No. of dams contributed	360	216
Effective No.	208.5	156.3
Rate of inbreeding	0.0021	0.0026
Selection intensity	0.45	0.32

Hatching records

The fertility in G-2 *Jabalpur colour*, *Kadaknath* and *Kadaknath* cross (50% *Kadaknath* and 50% *Jabalpur colour*) was 87.03%, 85.85% and 82.01%, respectively. It was almost similar to G-1 generation population in *Jabalpur colour* & *Kadaknath* Cross and improved in *Kadaknath* population. Hatchability on fertile egg set basis has improved in *Jabalpur colour*, *Kadaknath*, and *Kadaknath* cross (Table 57).

Table 57. Hatching records of *Jabalpur colour*, *Kadaknath* and *Kadaknath* cross

Breed/ variety/ cross	Gen./ year	Total eggs set (Nos.)	Fertile eggs (Nos.)	Fertility (%)	Total chicks (Nos.)	Hatchability (%)	
						TES	FES
Jabalpur colour	G-1	4877	4306	88.09	2824	57.80	65.63
	G-2	**5198**	**4525**	**87.03**	**3186**	**61.22**	**70.42**
Kadaknath	G-1	1858	1547	83.42	1017	53.88	64.71
	G-2	**1690**	**1451**	**85.85**	**1007**	**59.58**	**69.40**
Kadaknath Cross	2020-21	720	596	82.66	430	59.76	66.67
	2021-22	**1160**	**949**	**82.01**	**658**	**56.85**	**69.38**

Mortality and disease incidence pattern

The mortality in G-1 generation of JB colour during 21-40 weeks and 41-72 weeks of age were 3.27 and 5.01%, respectively (Table 58). The mortality of G-1 *Kadaknath* flock during these periods was 3.57 and 5.01%,

respectively. Crossbred *Kadaknath* has shown 3.50% mortality during 21-40 weeks period. The mortality was within the permissible range in all the germplasms. The mortality in G-2 generation of JB colour, *Kadaknath* and crossbred *Kadaknath* during 0-6 weeks period were 6.07%, 5.64% and 5.76%, respectively.

Table 58. Mortality record in *Jabalpur colour*, *Kadaknath* and *Kadaknath* cross

Breed/ variety/ cross	Year	Mortality (%)			
		0-5 wks	6-20 wks	21-40 wks	41-72 wks
Jabalpur colour	G-1	6.01	3.37	3.57	4.88
	G-2	**6.07**	**-**	**-**	**-**
Kadaknath	G-1	5.88	3.38	3.27	5.01
	G-2	**5.64**	**-**	**-**	**-**
Kadaknath Cross	G-1	6.06	3.66	3.50	-
	G-2	**5.76**	**-**	**-**	**-**

Performance of pure lines and different crosses under different management systems

Production performance of Jabalpur colour population

The G-1 generation *Jabalpur colour* attained body weight of 1555 g at 20 weeks and 1940 g at 40 weeks of age. Sexual maturity was attained at 156 days of age. Hen day egg production up to 40, 52 and 72 weeks of age were 99.3, 161.0 and 247.5 eggs, respectively. Egg weight at 28 and 40 weeks of age was 48.5 and 55.4 g, respectively. Body weight at 20 and 40 weeks of age was lower than previous generation whereas 40 weeks egg weight and egg production was little bit better than G-0 generation flock (Table 4). Replacement flock of G-2 generation population attained 6 weeks body weight of 705.3g on pooled sex basis. Conformation traits such as shank length (SL), keel length and breast angle of male and female were recorded (Table 59).

Table 59. Production Performance of *Jabalpur colour* population

Traits	2020-21		2021-22			
	G-0 generation (Base population)		G-1 generation		G-2 generation	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g)						
6 wks	-	-	2695	702.5 ±78	3158	705.3 ± 83
12wks	260	1010 ± 14.3				
20wks	165	1561 ± 21.5	480	1555 ± 26.3		
40wks	156	1970 ± 20.6	450	1940 ± 27.3		
52wks			442	2100 ± 25.3		
72wks			400	2710± 21.3		
ASM (days)	165	155 ± 1.12	480	156 ± 1.05		
Confirmation traits	**(12 wks age)**		**(6 wks age)**			
Shank length (cm)						
M	62	8.19	1215	7.68 ±.03	1428	7.65± .04
F	198	7.53	1480	7.15±.05	1730	7.09± 03
Keel length (cm)						
M	62	8.80	1215	8.17±.04	1428	8.18± .05
F	198	8.15	1480	7.85 ±.02	1730	7.87±.02
Breast angle (º)						
M	62	660	1215	60.50 ±1.18	1428	60.80 ± 1.23
F	198	62	1480	58.70 ±1.23	1730	58.50 ±1.07
Egg weight (g)						
28 wks	160	48.7 ± 0.35	471	**48.5 ± 0.31**		
40 wks	156	55.1 ± 0.32	450	**55.4 ± 0.27**		
EP 40 wks (Nos.)						
Hen housed	156	95.7 ± 01.75	450	**96.0 ± 1.47**		
Hen day		98.5 ± 2.05	-	**99.3 ± 1.95**		
EP 52 wks (Nos.)						
Hen housed	156	154.5 ± 1.70	442	**155.0 ± 1.41**		
Hen day		160.4 ± 1.50	-	**161.0 ± 1.60**		
EP 72 wks (Nos.)						
Hen housed			400	**238.0 ± 2.08**		
Hen day				**247.5 ± 2.12**		

Production performance of Kadaknath population

The G-1 generation of *Kadaknath* attained 1098 and 1500g body weight respectively at 20 and 40 weeks of age. These birds attained sexual maturity at 169 days of age. Hen day egg production up to 40, 52 and 72 weeks period was 63.0, 93.2 and 116.7 eggs, respectively. Egg weight was almost similar to that recorded in G-0 generation flock. Egg production up to 40 weeks and 52 weeks of age was higher by 0.4 and 0.5 egg per hen, respectively (Table 60).

Replacement flock of G-2 generation *Kadaknath* attained 6 weeks pooled sex body weight of 399.4 g. Shank length of male and female was 6.76 cm and 5.97 cm, respectively and keel length of male and female was 7.30 cm and 7.05 cm, respectively.

Table 60. Performance of *Kadaknath* population

Traits	2020-21		2021-22			
	G-0 generation (Base population)		G-1 generation		G-2 generation	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body weight (g)						
6 wks	-	-	900	398.1 ± 7.4	975	399.4 ± 8.6
12wks	104	635.4 ± 8.4				
20wks	90	1051 ± 16.4	315	1098 ± 21.5		
40wks	72	1545 ± 17.5	300	1500 ± 20.5		
52wks			275	1640 ± 23.2		
72wks			250	1905 ± 27.8		
ASM (days)	90	168 ± 1.19	315	169 ± 1.16		
Confirmation traits	**(12 wks age)**		**(6 wks age)**			
Shank length (cm)						
M	24	7.15 ±.08	410	6.95 ±0.04	435	6.76 ± 0.08
F	80	6.75 ±.05	490	6.05 ±0.04	540	5.97 ± 0.05
Keel length (cm)						
M	24	7.75 ±.03	410	7.42 ±0.03	435	7.30 ± 0.07
F	80	7.35 ±.04	490	7.10 ±0.05	540	7.05 ± 0.03
Breast angle (°)						
M	24	60 ±.07	410	57.0 ± 0.08	435	55.20 ±1.08
F	80	56 ±.08	490	52.7 ± 1.02	540	51.31±1.07
Egg weight (g)						
28 wks	81	40.7 ± 0.08	308	**40.5 ±0.05**		
40 wks	72	48.3 ± 0.25	300	**48.2 ±0.30**		
EP 40 wks (Nos.)						
Hen housed	72	57.3 ± 2.02	300	**58.1 ± 1.90**		
Hen day		62.5 ± 1.85	-	**63.0 ± 1.70**		
EP 52 wks (Nos.)						
Hen housed	72	91.2 ± 1.9	275	**91.8 ± 2.01**		
Hen day		92.8 ± 1.3	-	**93.2 ± 1.40**		
EP 72 wks (Nos.)						
Hen housed			250	**110.5 ± 1.69**		
Hen day				**116.7 ± 1.80**		

Production performance of Narmadanidhi (Commercial dual-purpose colour bird)

Narmadanidhi (75% *Jabalpur colour* col and 25% *Kadaknath*) were evaluated under farm and field conditions. Eight weeks body weight under farm rearing was 1010 g and 725g for males and females, respectively. Under field rearing average body weight at 8 weeks of age was 763.0 and 629.0g in males and females, respectively. The 20 weeks body weight in farm and field conditions was 1506 and 1384g for males and 1373 and 1126g for females, respectively.

In farm rearing, birds matured at 168 days and laid 109 egg up to 52 weeks of age and 222 eggs up to 72 weeks of age with average egg weight of 49.0g. Under field rearing egg production up to 52 and 72 weeks of age were 91.2 eggs and 175 eggs, respectively with average egg weight of 47.48 g (Table 61). The birds have shown better survivability in field rearing.

Table 61. Performance of *Narmadanidhi* under farm and field (2021-22)

Traits	N	Farm	N	Field
Body wt. at 8 wks (g)				
M	110	1010±20.3	125	763±21.5
F	165	725±11.5	215	629±13.2
Body wt. at 20 wks (g)				
M	105	1506±23.3	114	1373±28.2
F	157	1384±20.4	199	1126±23.2
ASM (days)	262	168±1.3	-	-
EW 40 wks (g)	152	49.0±0.2	191	47.48±0.51
EP 40 wks (Nos.)	148	58±1.6	191	41±2.9
EP 52 wks (Nos.)	148	109±1.9	186	91.2±2.8
EP 72 wks (Nos.)	144	222±2.2	171	175±3.2

Implementation of DAPSC component

Under DAPSC component of the project, 5 trainings were conducted at Silua and Padriya village of Panagar Block of Jabalpur district. A total of 100 farmers participated in these training programme. After successful completion of trainings, inputs such as *Narmadanidhi* chicks, feed, feeders and waterers were provided to the farmers.

Implementation of STC component

Under STC component of the project, 4 trainings were organized at villages viz Bijadandi, Ghugri, Khapa, Moinyala, Dhobi, Jamuniya and Babniya of Narayanganj block of Mandla district. A total of 80 farmers (male and female) have participated in the training programme. After successful completion of the trainings, inputs including *Narmadanidhi* chicks, feed and equipment (feeders and waterers) were provided to the tribal farmers.

Trainings conducted

Conducted 2 two days training programme on "Capacity building of tribal farmers for Rural Poultry Farming" from 24 to 25 March, 2022 and "Basic health and feeding practices in backyard poultry and ways to enhance income generation through backyard poultry farming" from 10 to 11 Feb, 2022. Further, seven one day on farm training activities/exposure visits were organized for farmers in Collaboration with NGOs and other organization.

Germplasm supplied

A total of 51,361 germplasm (chicks/fertile eggs/ growers) were supplied to 411 backyard/ small farmers.

Revenue generation

The centre realized a receipt of Rs.30.57 lakhs revenue which was 71.19% of the expenditure on feed cost (Rs. 42.94 lakhs).

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

- G-11 generation of *Mewari* breed was evaluated up to 52 weeks of age.
- *Pratapdhan* was evaluated for production traits up to 72 weeks of age during E10 generation.
- RIR and CSFL populations were regenerated and being maintained at the centre
- Germplasm of *Pratapdhan*, a dual-purpose variety was supplied to the needy farmers.

Achievements

Incubation records

The centre regenerated G-12 generation of Mewari chicken population as well as RIR, CSFL, BN and BNR populations. The fertility was slightly lower in all the populations (except CSFL and BN cross) as compared to previous generation. However, the hatchability on total as well as on fertile eggs set improved in all the populations in the present generation as compared to previous generation (Table 62).

Table 62. Summary of incubation and hatching results of different populations

Strain / breed/ cross	Gen./Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks (Nos.)
				TES	FES	
Mewari	2017-18 (G-8)	5123	78.44	67.70	86.37	3462
	2018-19 (G-9)	4537	78.06	66.21	84.79	2992
	2019-20 (G-10)	4203	80.16	65.10	81.26	2726
	2020-21 (G-11)	2826	81.43	64.78	79.55	1837
	2021-22 (G-12)	**2842**	**80.55**	**68.33**	**85.07**	**1964**
RIR	2017-18	4200	91.52	79.40	86.75	3335
	2018-19	6500	84.49	73.78	87.31	4827
	2019-20 (G-9)	6355	86.83	73.44	84.41	4560
	2020-21 (G-10)	6300	82.90	69.16	83.20	4357
	2021-22	**-**	**-**	**-**	**-**	**4000**
CSFL	2017-18	420	92.97	79.76	85.90	335
	2018-19	400	87.00	65.50	75.29	262
	2019-20 (BG-9)	1124	86.08	66.48	77.14	763
	2020-21 (G-10)	810	87.77	72.23	82.28	617
	2021-22	**478**	**90.59**	**79.08**	**87.30**	**378**
BN cross	2017-18	9203	76.54	67.31	87.88	6143
	2018-19	2098	78.57	66.56	84.74	1391
	2019-20	2359	84.07	65.22	76.77	1473
	2020-21	1936	84.20	67.40	80.18	1310
	2021-22	**2309**	**84.27**	**68.75**	**81.66**	**1583**
Pratapdhan (BNR cross)	2017-18	98246	84.80	73.04	86.03	72450
	2018-19	82843	81.21	70.39	86.83	58777
	2019-20	31948	86.03	68.99	79.92	22537
	2020-21	30511	84.25	67.93	80.55	21027
	2021-22	**19614**	**81.13**	**70.23**	**86.62**	**13872**

Mortality

The incidence of mortality in various populations is presented in Table 63. The mortality was on lower side in purebred populations during juvenile period except in CSFL compared to previous year. However, during growing period the mortality increased in all the populations and was considerably higher in RIR. The mortality was higher in RIR from 6 weeks onwards. The centre is taking adequate measures to control mortality in RIR birds.

Table 63. Mortality (%) records at different age in different populations

Breed/ strain/cross	Gen./ Year	0-5 wks	6-20 wks	21-40 wks	41- 52 wks
Mewari	G-8	5.42	6.90	7.33	4.17
	G-9	4.86	7.83	6.91	3.58
	G-10	5.69	7.79	5.46	3.25
	G-11	**4.84**	**6.06**	**5.75**	**4.75**
RIR	G-8	6.68	8.79	7.38	5.96
	G-9	5.79	8.57	6.27	5.22
	G-10	4.90	9.31	5.51	4.25
	G-11	**4.68**	**13.91**	**12.96**	**4.87**
CSFL	2018-19	6.43	7.94	7.32	4.55
	2019-20	5.74	8.11	6.18	5.18
	2020-21	2.80	8.03	4.05	3.91
	2021-22	**5.14**	**6.33**	**5.35**	**4.88**
BN cross	2018-19	5.02	7.61	6.86	6.20
	2019-20	5.39	9.38	6.12	7.66
	2020-21	5.16	7.55	4.75	3.78
	2021-22	**5.85**	**7.34**	**9.76**	**7.50**
Pratapdhan (BNR cross)	2018-19	3.25	3.62	7.35	4.48
	2019-20	4.75	5.25	9.14	3.96
	2020-21	4.25	6.29	4.10	3.11
	2021-22	**3.25**	**5.57**	**9.66**	**6.87**

Performance evaluation of germplasm

In *Mewari* population the juvenile body weights at 8 weeks slightly increased during G-11 generation. Similarly, body weight recorded at 16 weeks of age on pooled sex was also slightly increased as compared to previous generation. The body weight of females at 20 and 40 weeks of age has also slightly increased as compared to G-10 generation. The age at sexual maturity has slightly improved over previous (G-10) generation. The hen housed, hen day and survivors' egg production up to 40 and 52 weeks of age have improved except hen day egg production up to 40 weeks which was decreased as compared to previous generation (Table 64).

Table 64. Growth and production performance of *Mewari* in different generations

Traits	*Mewari* (G-11)		*Mewari* (G-10)	
	N	Mean±SE	N	Mean±SE
Body wt. (g), pooled				
day old	2249	32.03±0.15	3250	32.09±0.06
8 wks	1091	630.1±2.6	1022	608.2±2.7
16 wks	793	991.8±8.29	989	967.4±7.7
20 wks*	429	1426±11.01	602	1408±12.7
40 wks*	283	1743±13.47	378	1732±15.6
ASM (d)	169	165.8±2.19	182	167.5±0.65
Egg wt. (g)				
28 wks	308	42.88±0.31	252	42.09±0.21
40 wks	232	45.92±0.36	228	45.55±0.24
EP 40 wks (Nos.)				
Hen housed	313	34.60±0.39	487	25.99± 0.30
Hen day		35.74	-	37.27
Survivors'	295	36.71±0.39	460	27.52± 0.31
EP 52 wks (Nos.)				
Hen housed	313	48.49±0.51	487	47.80± 0.30
Hen day		52.46	-	50.60
Survivors'	281	54.01±0.44	445	52.32± 0.32
EP 72 wks (Nos.)				
Hen housed	-	-	**487**	**76.12±0.37**
Hen day	-	-		**100.46**
Survivors'	-	-	**411**	**90.22±0.40**

*Values for females only from 20 weeks onwards

Evaluation of *Pratapdhan*

E-10 generation of *Pratapdhan* was evaluated up to 72 weeks of age (Table 65). The pooled body weights at different ages decreased except second weeks body weight. Similarly, the body weight of female at 20 weeks of age has also decreased as compared to previous evaluation. The hen housed and hen day egg production up to 40, 52 and 72 weeks of age increased as compared to previous evaluation.

Table 65. Growth and production performance of *Pratapdhan* during different evaluations

Traits			*Pratapdhan*				
	N	E10	N	E9	N	E8	E7
Body weight (g), pooled							
day old	456	39.01±0.17	400	39.18±0.20	400	38.77±0.14	39.02 ± 0.13
2 wks	424	145.2±3.49	390	142.8±1.88	383	140.0 ± 0.90	147.7 ± 1.10
4 wks	308	268.5±3.06	381	277.8±2.82	348	355.0 ± 4.15	378.1±3.47
8 wks	271	750.5±0.46	370	866.8±7.39	321	870.1±7.56	963±11.94
20 wks*	191	1950±17.2	293	2155±24.4	178	1961±12.5	1927±15.70
AFE in the flock (d)		**140**	-	146		132	134
ASM (d)	151	**159.3±0.67**	139	157.6±0.64	151	155.9±0.60	157.6±0.78
Egg wt. (g)							
28 wks	252	**46.88±0.34**	210	46.44±0.34	352	46.77± 0.30	47.27± 0.27
40 wks	192	**53.10±0.40**	208	52.39±0.25	229	52.67± 0.24	52.57±0.21
EP 40 wks (Nos.)							
Hen housed	124	**49.66±0.85**	130	50.26± 0.56	149	41.19	52.35
Hen day	-	**53.01**	-	52.3	-	58.83	62.26
Survivors'	110	**55.98±0.82**	121	54.09± 0.47	139	53.04	77.84
EP 52 wks (Nos.)							
Hen housed	124	**82.19±0.82**	130	83.25± 0.56	149	71.9	72.3
Hen day	-	**92.86**	-	90.9	-	96.5	100.4
Survivors'	101	**100.9±0.79**	107	101.1± 0.67	112	95.7	152.7
EP 72 wks (Nos.)							
Hen housed	124	**131.9±0.69**	130	127.7± 0.59	149	97.6	100.3
Hen day	-	**160.25**	-	158.2	-	160.0	166.1
Survivors'	90	**181.8±0.73**	85	175.4± 0.85	104	139.9	

*Values for females only from 20 weeks onwards

Other activities

The other activities which were carried out during the report period are as under

A. Field Evaluation of *Pratapdhan*

The evaluation of *Pratapdhan* is being carried out both at farm and under varied field conditions in different agro climatic zones. A unit of 20 straight run chicks at 4 to 6 weeks were given to farmers for field evaluation along with evaluation sheet to record data with respect to body weights at different age and egg production under field conditions. The growth and production performance are presented in Table 66.

Table 66. Growth and production performance of *Pratapdhan* under field conditions

Traits	Mean±SE
Body wt. at 8 weeks (g)	
Pooled	587.3±30.57 (26)
Male	666.5±41.46 (13)
Female	508.1±32.45 (13)
Body wt. at 12 weeks	
Pooled	1275.7±29.0 (23)
Male	1296±41.9 (12)
Female	1254±38.8 (11)
Body wt. at 20 weeks	
Pooled	1749±31.2 (20)
Male	1818±46.8 (9)
Female	1689±34.2 (11)
Egg Production	
AFE (days)	150
HDEP up to (Nos)	
40 wks	47.70
52 wks	78.00
72 wks	144.8

B. Evaluation of meat type chicken

As per discussion held at the review meeting, the centre is engaged in developing and evaluation of meat type germplasm. The chicks were produced by crossing CSFL males with BN females. The chicks so produced were evaluated for body weight at 0, 2, 4, 6, 8, 10, and 12 weeks of age. The evaluation was done both at farm and under field conditions. The results of the evaluation are presented in Table 67 and 68.

Table 67. Growth performance of BBN (B X BN cross) under field conditions

Body wt. (g)	N	Male	N	Female	N	Pooled
Day old	54	34.05±0.43	46	33.70±0.45	100	33.89±0.31
2 wks	53	94.4±1.79	44	88.2±2.15	97	91.6±1.42
4 wks	47	253.8±11.6	42	224.2±9.4	89	239.8±7.7
6 wks	45	646.2±12.4	39	594.3±14.1	84	622.1±9.7
8 wks	41	949.9±33.5	37	799.3±20.6	78	878.4±21.8
12 wks	39	1800±47.0	37	1241±44.1	76	1528±45.5

Table 68. Growth performance of BBN (B X BN cross) under farm conditions

Body wt. (g)	N	Male	N	Female	N	Pooled
Day old	59	34.07±0.40	49	33.78±0.43	108	33.94±0.29
2 wks	54	95.8±1.50	49	87.78±2.00	103	92.05±1.30
4 wks	54	308.8±10.2	46	253.1±8.9	100	283.2±7.39
6 wks	52	735.6±14.4	44	661.0±13.8	96	701.4±10.7
8 wks	49	981.1±19.6	44	883.3±20.8	93	934.8±15.1
12 wks	47	1871±41.3	42	1346±39.0	89	1623±39.85

Implementation of STC

Under AICRP on Poultry Breeding, a unit of 20 chicks (4-6 weeks) of *Pratapdhan* and 25 kg of grower feed per farm family were supplied to a total of 206 farm families, thus a total 4120 chicks, 405 feeders, 405 drinkers and 5150 kg of feed were supplied.

Germplasm supply

A total of 20,108 germplasm (19,998 live birds and 110 hatching eggs) was supplied during the year.

Revenue generation

The centre realized the revenue receipt of Rs.5.45 lakhs during the year which was 47.70% of the feed cost of Rs 11.43 lakhs.

CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur (Himachal Pradesh)

Activities assigned

- Collection and evaluation of the local native chicken.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition.
- Production and evaluation of crosses of local native birds with improved germplasm.
- The center will work on development of new varieties suitable for rural poultry in the region utilizing local native germplasm.

Action taken

- The G-9 generation of native chicken was produced and being evaluated, while G-8 generation from previous year completed the evaluation from 40 weeks onwards. New local germplasm from different locations also being collected.
- The *Dahlem Red* population (G-7 generation) was evaluated up to 40 weeks of age, while previous evaluation completed for 40-72 weeks period. New *Dahlem Red* parent stock (1000) were also procured from ICAR-DPR, Hyderabad.
- The *Dahlem Red* X Native (DN) cross birds were produced and evaluated up to 52 weeks
- The chicks of *Himsamridhi* (DND cross) have been produced and evaluated at farm and field level up to 40 weeks for growth and production parameters.
- *Himsamridhi* (DND cross) birds from previous year completed evaluation up to 52 weeks at farm and field level.
- The overall fertility was good (88.70%) and ranged between 84.01% for native to 92.43% for *Dahlem Red*, whereas the overall hatchability on TES and FES was 74.77% and 84.30% respectively.
- On farm trial (OFT) and Front-Line Demonstration (FLD) for *Himsamridhi* was carried out in collaboration with KVKs in four districts and NGOs in two districts.

Achievements

Local germplasm

A total of 6024 Native stock chicks (G-9) were produced at hatchery by collecting fertile eggs from farm. Heritability estimate in native population (G-8) from sire component for body weight at 8, 12 and 20 weeks of age were 0.11±0.04, 0.21±0.03 and 0.28±0.07, respectively. Egg production records were also collected sire wise.

Improved germplasm

The G-8 generation of *Dahlem Red* breed was under evaluation up to 40 weeks of age and G-7 generation from previous year completed the evaluation from 52 to 72 weeks of age**.** New parental stock of *Dahlem Red* was procured from ICAR-DPR, Hyderabad and is being evaluated.

Incubation records

The summary of incubation records of various pure lines and crosses is presented in Table 69. The fertility is comparable to the previous year and ranged between 84.01% for Native to 92.43% for *Dahlem Red*. Hatchability showed improvement and ranged from 71.72 to 77.99% compared to previous year (69.11% and 79.33%) on TES and FES basis. Over all, fertility and hatchability of various lines were good.

Table 69. Summary of incubation and hatching

Strain/ cross	Year	No. of egg set	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Native	2020-21	12872	84.23	68.50	81.32	8818
	2021-22	**8399**	**84.01**	**71.72**	**85.37**	**6024**
Dahlem Red	2020-21	3297	86.90	69.70	79.06	2865
	2021-22	**8187**	**92.43**	**77.75**	**84.11**	**6366**
DN cross	2020-21	2180	87.71	69.63	79.39	1912
	2021-22	**3359**	**91.81**	**77.99**	**84.98**	**2620**
***Himsamridhi* (DND) cross**	2020-21	55374	86.20	67.38	78.16	44423
	2021-22	**78201**	**87.54**	**73.68**	**84.18**	**57624**

Mortality

The chick mortality (0-6 weeks) ranged from 0.98 to 6.35% (Table 70) during this year. The chick stage mortality reduced in comparison to previous year for *Dahlem Red*, Native and DN cross. The mortality during 7-20-weeks of age interval ranged from 2.26 to 3.30%. The grower stage mortality is reduced in comparison to previous year in all the stock**.** Mortality during 21 to 40 weeks period ranged from 1.63 to 2.83%. Non-specific causes like chilling, overcrowding or huddling and killing by rodents are among important causes of mortality. Further, the centre is also taking necessary precautions to reduce the mortality by including bio-security measures.

Table 70. Mortality (%) at different ages (weeks)

Strain/ cross	Year	Mortality (%)		
		0-6 wks	7-20 wks	21-40 wks
Dahlem Red (DR)	2020-21	6.87	4.14	3.11
	2021-22	**4.30**	**2.42**	**2.83**
Native	2020-21	1.33	4.63	3.54
	2021-22	**0.98**	**2.74**	**2.11**
DN cross	2020-21	3.44	7.20	1.80
	2021-22	**3.40**	**3.30**	**1.63**
Himsamridhi (DNXD cross)	2020-21	2.24	3.50	1.58
	2021-22	**6.35**	**2.26**	**2.06**

Performance evaluation of germplasm during the current year

The performance of *Dahlem Red* and Native (G-8) was evaluated (Table 71). The 4, 8 and 20 weeks body weights in DR were 220.7±2.2, 510.6.2±5.4 and 1550±13.5g, respectively whereas corresponding weights for Native population was 180.3±3.09, 550.2±24.9 and 1370±12.8g, respectively. The average egg weight (40 weeks) was 52.10±0.25 and 45.75±0.13g in DR and native population, respectively. ASM for DR and native population was 162 and 182 days, respectively. Body weight, egg weight and ASM were comparable to previous generation. DR stock continuing evaluation from previous year completed evaluation from 52-72 weeks during current year. HHEP at 52 and 72 weeks was 121.17 and 170.5, respectively while corresponding HDEP was 131.27 and 192.3, respectively. The egg weight at 52 weeks was 54.95±0.08g. Native parents (G-8) continuing evaluation from previous year completed evaluation from 52 weeks onwards with HHEP and HDEP up to 52 weeks as 77.98 and 82.57, respectively. The DN cross completed evaluation up to 52 weeks of age. The 20 weeks body weight was 1450±14.2 g, while ASM was 179 days. The HHEP up to 40 and 52 weeks of age were 66.31 and 106.96, respectively and corresponding HDEP up to 40 and 52 weeks were 68.04 and 111.6, respectively. The egg weight at 28, 40 and 52 weeks of age was 45.20±0.25, 50.10±050 and 52.65±0.10g, respectively. The performance of DN cross is similar to previous evaluation.

Evaluation of *Himsamridhi*

The DND cross (*Himsamridhi*) was evaluated under farm (Table 72) and field conditions (Table 73) for up to 72 weeks in previous and up to 40 weeks of age during present evaluation. The 20 weeks body weight was 1480g under farm and 1388g under field conditions. HHEP at 40 weeks of age was 71.65 and 55.60 under farm and field, respectively. *Himsamridhi* stock continuing evaluation from previous year completed evaluation from 52-72 weeks during current year. HDEP at 52 and 72 weeks was 118.68 and 174.32, respectively under farm conditions. HDEP under field evaluation from previous year completed 40 weeks onwards during current year with HHEP of 88.90 and 152.65, respectively.

Table 71. Growth and performance of *Dahlem Red* and Native chickens

Traits	*Dahlem Red*				Native			
	2021-22 (G-8)		2020-21 (G-7)		2021-22 (G-9)		2020-21 (G-8)*	
	N	Mean ±SE	N	Mean±SE	N	Mean ±SE	N	Mean ±SE
Body weight (g): Pooled sex								
Day old	1877	36.50±0.10	1267	35.80±0.13	289	30.15±0.10	554	30.62±0.25
4 wks	1783	220.7±2.2	1230	227.7±1.60	264	180.3±3.09	546	210.1±2.4
8 wks	1725	510.6±5.4	1020	540.2±4.7	246	550.2±21.9	528	510.4±24.9
20 wks	1680	1550±13.5	892	1561±14.2	229	1370±12.8	517	1325±10.2
40 wks	705	1495±20.5	428	1671±18.3	178	1520±24.0	367	1512±21.2
FCR (0-8 wks)	1000	4.43	1000	4.35	246	4.58	525	4.45
AFE (days)	705	137	468	152	125	150	150	155
ASM (days)	700	162	457	168	125	182	144	185
Egg weight (g) at								
28 wks	100	49.01±0.10	200	49.57±0.15	100	40.85±0.10	100	40.20±0.10
40 wks	100	52.10±0.25	150	51.06±0.10	100	45.75±0.13	100	46.05±0.16
52 wks	100	-	100	54.95±0.08			100	47.15±0.12
EP 40 wks (Nos.)								
HH	705	78.70	468	77.27	121	46.09	**144**	**46.95**
HD	688	80.65	440	78.05	118	47.26	**142**	**48.10**
Survivors'	662	83.81	419	81.57	112	49.79	**139**	**52.05**
EP 52 wks (Nos.)								
HH	Under evaluation		468	121.17	Under evaluation		**144**	**77.98**
HD			432	131.27			**136**	**82.57**
Survivors'			410	138.31			**134**	**83.80**
EP 72 wks (Nos.)								
HH	Under evaluation		468	170.54	Under evaluation		**Culled at 64 wks**	
HD			415	192.31				
Survivors'			385	207.30				

*G-8 native and DR from 2020-21 evaluated in current year from 40 week onwards

Table 72. Growth and production performance of crosses produced

Traits	DN cross				DND cross (*Himsamridhi*)			
	2021-22		2020-21		2021-22		2020-21*	
	N	Mean ±SE	N	Mean ±SE	N	Mean ±SE	N	Mean ±SE
Body weight (g): Pooled sex								
Day old	232	34.20±0.25	554	33.80±0.12	250	33.95±0.20	285	34.95±0.15
4 wks	232	210.5±3.16	550	235.1±1.7	250	198.5±1.74	275	209.1±3.20
8 wks	226	456.3±7.80	472	492.8±8.3	234	421.2±5.80	260	550.6±12.60
20 wks	96	1450±14.2	400	1470±13.9	172	1480±11.60	245	1512.±16.60
40 wks	91	1610±20.6	90	1535±11.8	115	1595±21.65	120	1620±15..20
FCR (0-8 wks)	226	5.52	190	4.50	250	33.95±0.20	250	4.45
AFE (days)	96	138	118	152	115	132	125	152
ASM (days)	96	179	90	173	112	174	125	160
Egg weight (g) at								
28 wks	50	45.20±0.25	50	49.02±0.10	50	46.55±0.10	50	47.10± 0.15
40 wks	50	50.10±0.50	50	50.90±0.15	50	51.95±0.28	50	51.29±0.16
52 wks	50	52.65±0.10	50	52.85±0.10	50	--	50	53.25±0.15
EP 40 wks (Nos.)								
HH	96	66.31	90	60.92	115	72.84	**125**	**71.65**
HD	93	68.04	89	61.60	112	74.79	**123**	**72.81**
Survivors'	91	69.95	87	63.02	108	77.56	**120**	**74.63**
EP 52 wks (Nos.)								
HH	96	106.96	90	103.40	Under evaluation		**125**	**114.88**
HD	92	111.60	84	110.80			**121**	**118.68**
Survivors'	88	116.69	80	116.32			**118**	**121.69**
EP 72 wks (Nos.)								
HH	Under evaluation		Culled at 66 wks		Under evaluation		**125**	**161.76**
HD							**116**	**174.32**
Survivors'							**112**	**180.54**

*DND cross of 2020-21 evaluated in current year from 40 week onwards

Table 73. Performance of DND (*Himsamridhi*) at farmer's flocks

Traits	2021-22 (E-7)		2019-20 (E-6) *	
	N	Mean ±SE	N	Mean±SE
Body weight (g)				
4 wks	670	195.3± 3.48	525	178.5±4.45
8 wks	518	403.8± 4.39	380	418.8±3.63
20 wks Male	80	1558±19.08	65	1690±24.70
20 wks Female	190	1388±23.65	190	1425±18.50
40 wks Male	20	2150±34.93	-	-
40 wks Female	170	1490± 21.6	150	1518±18.25
ASM (days)	190	210	120	215
Egg weight (g) at				
28 wks	100	45.10±0.36	100	44.80±0.42
40 wks	100	49.55±0.47	50	50.46±0.30
EP 40 wks (Nos.)				
40 wks	170	55.60	**150**	**52.50**
52 wks	Under evaluation		**115**	**88.90**
72 wks	Under evaluation		**95**	**152.6**

*Evaluated from 40 week onwards in 2020-21

Implementation of STC/TSP.

Under the Scheduled Tribe Component (STC), 7900 chicks were supplied free of cost to 158 ST farmers along with starter feed of 50 kg/unit, feeder, drinkers and medicines and 11 FLD were established in coordination with NGOs and Farmer's first program. Three training programs were organized under TSP component for 110 beneficiaries for tribal farmers of Kangra and Chamba region. While 9 one day awareness programs were conducted covering 235 farmers. Survey was also done in tribal areas to identify more poultry farmers for establishment of poultry units in coming year.

Germplasm supply

During the year, the centre supplied 70,333 chicks/growers of *Himsamridhi*/ DND cross, Native and other crosses to farmers (791 farm units) including 158 TSP units.

Revenue generation

The centre realised receipts of Rs 19.52 lacks during the financial year on account of sale of various poultry products (chicks, eggs, culled birds) which was 90.92% of expenditure on feed cost (Rs 21.47 lacks).

Assam Agricultural University, Guwahati (Assam)

Activities assigned

- Evaluation and improvement of the local native chicken germplasm and to be maintained as pure line.
- Evaluation of improved chicken germplasm in the local climatic condition
- Evaluation of *Kamrupa* in different agroclimatic conditions.

Action taken

- A total of 697 numbers of indigenous grower and adult birds are kept in the farm and their performances are under evaluation.
- The performance of a flock of 96 nos. of PB-2 male procured from the DPR, Hyderabad is also studied.
- A flock of 346 nos. of crossbred (PB-2 x Indigenous) have been maintained in the centre and their performance is studied upto 72 weeks
- The performance of 1139 nos. of *Dahlem Red* birds procured from DPR, Hyderabad is evaluated.
- A flock of 908 numbers of *Kamrupa* birds have been kept in the centre and their performance is evaluated in the farm and field condition up to 72 weeks.
- Performance of a flock of 712 nos. of *Daothigir* birds procured originally from Kokrajhar district is under evaluation.

Achievements

A total of 697 numbers of indigenous growers and adult are kept in the farm and their performances are under evaluation. The performance of a flock of 96 nos. of PB-2 male procured from the DPR, Hyderabad is also studied up to 40 weeks. A flock of 346 nos. of BN crossbred (PB-2 x Indigenous) have been maintained and their performance is studied. The performance of 1139 nos. of *Dahlem Red* birds procured from DPR, Hyderabad is evaluated up to 72 weeks. A flock of 908 numbers of *Kamrupa* have been kept in the centre and their performance is evaluated in the farm and field condition up to 72 weeks. Performance of a flock of 712 nos. of *Daothigir* birds procured originally from Kokrajhar district is under evaluation.

Table 74. Summary of incubation and hatching

Strain	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Good chicks (Nos.)
				TES	FES	
Native	2019-20	718	80.08	65.74	82.08	472
	2020-21	1280	80.63	65.86	81.69	843
	2021-22	**1420**	**80.98**	**66.76**	**82.43**	**948**
BN cross	2019-20	519	66.67	53.94	80.92	280
	2020-21	901	67.48	55.27	81.90	498
	2021-22	**881**	**67.65**	**55.73**	**82.38**	**491**
BND cross	2019-20	30226	90.15	83.32	92.42	25183
	2020-21	19765	90.18	84.86	94.09	16773
	2021-22	**44953**	**90.25**	**84.97**	**94.15**	**38198**
Daothigir	2020-21	451	79.60	66.96	84.12	302
	2021-22	**1398**	**80.33**	**67.31**	**83.79**	**941**

Incubation records

Summary of incubation records has been presented in Table 71. The fertility of different flocks during 2021-22 were ranged from 67.65 to 90.25 %. The hatchability on total eggs set ranged from 55.73 to 84.97 % in different flocks with a overall average of 89.29%. In *Daothigir* flock the fertility, hatchability on total egg set and fertile egg set were 80.33, 67.31 and 83.79 %, respectively with an overall average of 83.40% and showed a slight increase compared to previous generation.

Mortality

The mortality during the current year is presented in Table 72. The overall average mortality of all lines during brooding and growing period were 3.30 and 2.82%, respectively. The overall average mortality during laying period was 1.19%. Percent mortality during 0-5, 6-20, 21-40 and 41-52 weeks of age in *Daothigir* flock was 4.59, 4.13, 3.34 and 2.55, respectively and corresponding values in BND cross was 3.41, 2.43, 2.31 and 0.73, respectively.

Table 75. Mortality at different periods

Strain	Year	0-5 wks	6-20 wks	21-40 wks	41-52 wks
Native	2019-20	2.32	2.16	1.05	0.97
	2020-21	2.31	2.13	1.13	1.06
	2021-22	**2.27**	**2.08**	**1.31**	**1.07**
PB-2	2019-20	2.67	2.05	1.39	1.41
	2020-21	3.12	2.58	1.98	2.72
	2021-22	**3.13**	**3.23**	**2.22**	**3.41**
Dahlem Red	2019-20	3.92	2.80	1.48	0.92
	2020-21	3.94	4.50	1.46	0.95
	2021-22	**4.24**	**4.18**	**1.51**	**0.90**
BN cross	2019-20	1.94	1.32	0.67	0.51
	2020-21	1.82	1.43	2.03	0.74
	2021-22	**1.91**	**1.38**	**2.09**	**0.71**
BND cross	2019-20	3.47	2.58	1.18	0.63
	2020-21	3.38	2.49	2.27	0.77
	2021-22	**3.41**	**2.43**	**2.31**	**0.73**
Daothigir	2019-20	-	4.04	3.15	-
	2020-21	4.63	4.16	3.26	2.62
	2021-22	**4.59**	**4.13**	**3.34**	**2.55**

Performance evaluation of germplasm

Performance of *Daothigir*

The juvenile and production traits in *Daothigir* are presented in Table 76. The body weights at 20 and 40 weeks of age were 1161 and 1851 g, respectively and improved as comparted to previous generation (1080 and 1730 g). The age at sexual maturity was 197.1 days. The egg weight and egg production (Hen housed) up to 40 weeks were 36.40 g and 38.90 eggs, respectively. The egg weight and egg production (Hen housed) up to 72 weeks were 36.90 g and 116.90 eggs, respectively.

Performance of pure lines

The juvenile and production traits in native, PB-2 and *Dahlem Red* are presented in Table 77. The 5 weeks body weight was 180.6 g in indigenous, 1221 g in PB-2 and 440.1 g in *Dahlem Red* and showed improvement compared to previous year (160.4, 1170 and 390.2 g). The ASM was lowest in *Dahlem Red* (158.1 days) and highest in indigenous (172.1 days). In native population, the egg weight and egg production up to 72 weeks was 41.90 and 111.9 eggs, respectively and slight increased as compared to previous generation (41.60 g and 110.8 eggs). In *Dahlem Red* population the egg production improved by 1.1 eggs up to 52 weeks. In *Dahlem Red* population, the egg weight and egg production up to 40 and 72 weeks of age were 59.80, 62.80 g and 64.30 and 215.6 eggs, respectively.

Performance of crosses

The five weeks body weight was 390.6 g and FCR was 3.00 in BN cross (Table 78). The age at sexual maturity was 165.10 days and matured 1.1 days earlier similar as compared to previous generation. The hen housed egg production up to 72 weeks was 123.90 eggs. Almost all the parameters are same as compared to previous generation.

Table 76. Juvenile and production performance of *Daothigir*

Traits	*Daothigir*	
	N	Mean ± SE
Body wt. (g)		
Day old	600	27.10 ± 1.35
5 wks	560	270.6 ± 3.95
20 wks	540	1161±115.6
40 wks	520	1851±155.6
FCR up to 5 wks	560	3.00
Conformation traits at 5 wks of age		
Shank length (mm)	560	51.40±0.60
Keel length (mm)	560	55.80±0.95
Breast Angle (o)	560	42.10±0.85
ASM (days)	240	197.1±6.95
Egg wt. (g)		
32 wks	230	32.10±4.15
40 wks	220	35.10±3.65
52 wks	210	36.40±4.65
72 wks	200	36.90±4.15
EP 40 wks (No.)		
Hen housed	240	38.90
Hen day	-	40.50
Survivors'	220	41.30
EP 52 wks (No.)		
Hen housed	240	65.90
Hen day	-	67.30
Survivors'	210	70.80
EP 72 wks (No.)		
Hen housed	240	116.90±6.15
Hen day	-	118.30±7.16.
Survivors'	190	121.70±8.16

The *Kamrupa* variety was evaluated up to 72 weeks in farm and field conditions during the current year. The 5 weeks body weight was 38.06 and 285.3 g in the farm and field, respectively. The age at sexual maturity was 148.1 days in the farm and 169.1 days in the field. The egg weight at 40 weeks of age was 57.60 and 43.10 g, respectively in farm and field, respectively. The hen housed egg production up to 40 weeks, 52 weeks and 72 weeks of age was 51.20, 92.80 and 155.50 eggs in the farm and corresponding values in the field were 45.30, 75.60 and 124.30 eggs, respectively. The performance of cross was slightly improved over last two generations (Table 79)

Table 77. Juvenile and production traits in pure lines

Traits	Native		PB-2		*Dahlem Red*	
	N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Body wt. (g)						
Day old	600	35.60 ± 2.62	96	46.70 ± 4.15	600	37.20 ± 3.10
5 wks	550	180.6 ± 8.20	80	1221 ± 65.35	570	440.1 ± 71.65
20 wks	510	1341 ±112.35	60	2491± 175.85	530	1391 ± 125.80
40 wks	480	1790 ±145.50	50	3441 ± 410.20	500	1951 ± 435.60
FCR up to 5 wks	550	3.11	80	2.80	570	2.65
Conformation traits at 5 wks of age						
Shank length (mm)	550	49.50±3.15	80	76.80±6.45	570	61.40 ± 3.15
Keel length (mm)	550	52.60±5.15	80	89.10±9.25	570	54.50 ± 2.95
Breast Angle (o)	550	57.80±8.65	80	74.10±5.20	570	63.80 ± 2.75
ASM (days)	270	172.1±6.85	-		500	158.1±7.50
Egg wt. (g) at						
32 wks	260	37.10±3.25	-		460	49.90 ± 4.65
40 wks	250	38.20±6.10	-		440	59.80 ± 8.43
52 wks	240	41.20±6.35	-		410	61.80 ± 7.20
72 wks	220	41.90±6.82	-		400	62.80 ± 10.3
EP 40 wks (No.)						
Hen housed	270	40.90	-		500	64.30
Hen day	-	42.90	-		-	66.40
Survivors'	240	43.20	-		460	68.20
EP 52 wks (Nos.)						
Hen housed	270	70.50	-		500	121.90
Hen day	-	71.80	-		-	123.30
Survivors'	210	75.10	-		410	125.40
EP 72 wks (Nos.)						
Hen housed	270	111.90	-		500	215.60
Hen day	-	113.80	-		-	217.60
Survivors'	190	116.20	-		390	220.40

Table 78. Juvenile and production performance of two way cross at farm

Traits	Nos.	Mean ± SE
Body wt. (g)		
Day old	450	37.30± 6.23
5 wks	420	390.6± 35.1
20 wks	390	1981±195.3
40 wks	360	2771± 412.8
FCR up to 5 wks	420	3.00
Conformation traits at 5 wks of age		
Shank length (mm)	420	52.90±4.95
Keel length (mm)	420	54.70±7.16
Breast angle (o)	420	68.30±10.3
ASM (days)	250	165.10±9.27
Egg wt. (g) at		
32 wks	210	47.30±2.83
40 wks	190	50.10±9.26
52 wks	180	60.10±8.19
72 wks	160	60.50±7.96
EP 40 wks (No.)		
Hen housed	250	41.50
Hen day	-	42.80
Survivors'	190	45.40
EP 52 wks (No.)		
Hen housed	250	74.30
Hen day	-	75.90
Survivors'	180	78.70
EP 72 wks (No.)		
Hen housed	250	123.90
Hen day	-	126.90
Survivors'	150	129.20

Table 79. Juvenile and production performance of three way cross

Traits	*Kamrupa* (BND cross)			
	Field		Farm	
	N	Mean ± SE	N	Mean ± SE
Body wt. (g)				
Day old	520	38.60±3.25	580	38.60 ± 3.25
5 wks	510	285.3± 8.75	560	380.6±46.6
20 wks	490	1170±135.6	530	1531±175.3
40 wks	450	1930±421.2	510	2450±520.6
FCR up to 5 wks	510	-	560	2.60
Conformation traits at 5 wks of age				
Shank length (mm)	510	51.40±5.22	560	49.90±5.15
Keel length (mm)	510	55.30±8.95	560	51.70±9.85
Breast Angle (o)	510	53.60±7.92	560	69.10±12.35
ASM (days)	200	169.10 ± 8.52	290	148.10 ± 5.25
Egg wt. (g) at				
32 wks	260	41.70±2.95	260	51.90±6.95
40 wks	240	43.10±9.27	240	57.60±6.50
52 wks	220	45.70±9.35	230	59.80±7.45
72 wks	190	46.10±8.69	210	60.40±10.2
EP 40 wks (No.)				
Hen housed	200	45.30	290	51.20
Hen day	-	46.60	-	53.10
Survivors'	160	48.50±	240	55.40
EP 52 wks (No.)				
Hen housed	200	75.60	290	92.80
Hen day	-	77.10	-	95.10
Survivors'	160	80.10	220	96.10
EP 72 wks (No.)				
Hen housed	200	**124.30**	290	155.50
Hen day	-	125.40	-	158.70
Survivors'	130	**131.20**	210	162.25

Germplasm supply

The centre supplied 44,077 (7,668 hatching eggs and 36,409 chicks/growers of *Kamrupa*) germplasm to 202 rural farmers of Assam and north-eastern region.

Revenue generation

The centre realized receipt of Rs. 9.09 lakhs during the financial year which is 45.1% of expenditure on feed cost (Rs.20.15 lakhs).

Birsa Agricultural University, Ranchi (Jharkhand)

Activities assigned

- Genetic improvement of native chicken for body weight as well as egg production may be practised for brining faster genetic gain in the terminal crosses.
- Evaluation and improvement of the local native chicken germplasm and to be maintained as pure line.
- Procurement and evaluation of improved chicken germplasm in the local climatic condition.
- Evaluation of *Jharsim* in different agroclimatic conditions.

Action taken during 2021-22

- The centre evaluated G-10 generation of native population up to 20 weeks of age and G-9 up to 64 weeks of age.
- The G-8 generation of *Dahlem Red* population was evaluated up to 64 weeks of age and G-9 up to 20 weeks of age.
- Evaluation of *Jharsim* (E-9) up to 64 weeks of age and E-10 up to 20 weeks of age.

Achievements

The native germplasm was evaluated up to 20 weeks in G-10 generation and up to 64 weeks of age in G-9. The G-9 generation was reproduced with 360 chicks and 100 chicks were evaluated up to 72 weeks and in G-10 about 250 chicks were produced and half sib pedigree was recorded up to 20 weeks of age. Performance of *Dahlem Red was* evaluated up to 64 weeks of age and G-9 up to 20 weeks of age.

Incubation Records

The fertility was 87.24% in native and 96.69% in *Jharsim* (Table 80). The fertility slightly improved in the crosses from the previous year. The hatchability and total egg set was 66.03% in native and 85.91% in cross. Corresponding values of hatchability in fertile egg set basis was 75.68 and 88.84%, receptively. Care should be taken to improve the hatchability.

Mortality

During the current year mortality during brooding period was reduced, it was lower side in current year and ranged from 4.13- 5.21%. Mortality during growing stage was ranging from 3.02-5.14%. During laying period mortality was ranged from 3.98 – 5.18% (Table 81).

Table 80. Summary of incubation and hatching results for the period

Strains	Year	Eggs set (Nos.)	Fertility (%)	Hatchability (%)		Chicks (Nos.)
				TES	FES	
Native	**2021-22**	**12320**	**87.24**	**66.03**	**75.68**	**8125**
	2020-21	6280	87.50	66.81	76.36	4196
	2019-20	6352	86.38	65.38	75.68	4153
Jharsim parent	**2021-22**	**45576**	**96.69**	**85.91**	**88.84**	**39155**
	2020-21	34655	95.83	83.81	87.45	29045
	2019-20	45630	96.64	84.92	87.86	38750

Table 81. Mortality in different breeds and crosses at different weeks (%)

Breeds/ strains	Year	0-6 wks	7-18 wks	19-40 wks
Native	**2021-22**	**4.85**	**3.02**	**4.67**
	2020-21	4.96	3.06	4.75
	2019-20	5.12	3.15	5.10
Dahlem Red	**2021-22**	**4.97**	**5.02**	**5.18**
	2020-21	5.10	5.11	2.71
	2019-20	5.20	4.52	3.42
PB-2	**2021-22**	**4.04**	**4.10**	**5.18**
	2020-21	4.15	4.13	5.23
	2019-20	4.21	4.48	5.61
PB-2 x Native	**2021-22**	**4.13**	**3.07**	**3.98**
	2020-21	4.28	3.19	4.05
	2019-20	4.20	3.45	3.88
Jharsim	**2021-22**	**5.21**	**5.14**	**4.23**
	2020-21	5.39	5.22	4.28
	2019-20	5.97	5.74	4.42

Performance evaluation of germplasm

The egg production (hen day) of native population in G-9 generation was 31.29, 78.19 and 102.87 eggs at 40, 52 and 64 weeks of age,respectively (Table 82). Body weight at day old, 4, 8, 12 and 16 weeks of age in native (G-10) were 28.12, 167.4, 318.4, 551.3 and 759.7 g, respectively. Corresponding body weights in *Dahlem Red* (G-9) were 30.62, 18.8, 549.3, 869.6 and 1248 g, respectively. There is reduction in body weight and egg production in native population as compared to previous evaluation. The three-way crosses (*Jharsim,* E-10) was evaluated up to 20 weeks of age. The body weight at day old, 4, 8, 12, 16 weeks of age were 31.29, 185.1, 472.1, 946.8 and 1439 g, respectively (Table 83). The ASM was 164 days in

E-9 of *Jharsim.* The egg production (hen day) in E-9 of *Jharsim* was 35.65, 82.72 and 133.23 eggs up to 40, 52 and 64 weeks of age. Field performance of *Jharsim* was not reported by the centre.

Trainings conducted

A total 65 farmers from different districts of Jharkhand have been provided training on poultry production and management of 10 days duration.

Germplasm supply

Centre supplied 39,812 germplasm (6269 hatching eggs and 33543-day old chicks) to 208 farmers, NGOs, KVKs and other agencies.

Revenue generation

The centre realised a revenue of Rs. 6.26 lakhs during the financial year which was 41.1% of the expenditure on feed cost (Rs. 15.25 lakhs).

Table 82. Evaluation of pure line for growth and production performance

Traits	Native (G-9)	Native (G-10)	*Dahlem Red* (G-8)	*Dahlem Red* (G-9)	PB2 E-7 (N=100)
Body wt. (g)					
Day old	28.08±0.12	28.12±0.11	30.87±0.22	30.62±0.19	-
4 wk	166.3±0.87	167.4±0.94	179.9±1.48	180.8±1.17	-
8 wks	365.1±1.41	318.4±2.81	587.6±4.21	549.3±2.19	-
12 wks	771.6±2.19	551.3±2.93	908.8±4.43	869.6±3.18	-
16 wks	967.6±2.19	759.7±1.71	1217±4.76	1248±4.48	2265±15.91
20 wks					
M	1384±9.60	1285.3±7.32	1723±11.00	1710±9.51	3214±28.59
F	1139±3.20	1073±4.41	1528±5.37	1541±5.49	2697±13.03
ASM (d)	175	-	163	-	
EW 40 wks (g)	41.57±0.16		46.38±0.32		-
EP 40 wks (Nos.)					-
HD	31.29		34.84		
HH	30.84		34.03		
EP 52 wks (No.)					-
HD	78.19		80.59		
HH	75.49		77.54		
EP 64 wks (No.)					-
HD	102.87		128.2		
HH	99.44		123.6		

Table 83. Evaluation of Crosses for growth and production performance

Traits	*Jharsim*			PB2 X Native	
	E-8	E-9	E-10	E-6	E-7
Body wt. (g)					
Day old	-	31.64±0.19	31.29±0.21	30.56±0.17	29.85±0.22
4 wks	-	182.4±0.68	185.1±0.78	178.8±0.75	180.9±0.92
8 wks	-	466.7±4.38	472.1±4.61	428.5±3.81	437.9±4.76
12 wks	-	948.8±3.41	946.8±3.33	747.4±432	771.3±7.67
16 wks	-	1444±5.70	1439±5.75	1023±4.32	1055±7.26
20 wks	-			-	
M		1840±11.9	1874±9.80		1453±8.82
F		1640±3.03	1643±2.80		1215±7.66
ASM (d)	161	164			-
EW 40 wks (g)	44.37±0.18	44.28±0.29			-
EP 40 wks (No.)					-
HD	35.49	35.65			
HH	35.07	34.98			
Survivors'					
EP 52 wks (No.)					-
HD	82.17	82.72			
HH	80.58	79.84			
Survivors'					
EP 64 wks (No.)					-
HD	144.02	133.23			
HH	140.61	127.70			
Survivors'					

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

I) 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. Recent generations were reproduced with 25 sires and 125 dams. 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-16 generation: The number of sires and dams used to regenerate LC-16 generation, effective population size and rate of inbreeding are presented are presented in Table 84.

Table 84. 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 in breeding (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
LC-16	25	125	83.33	0.0060

Incubation records

Incubation records of LC-16 generation in layer control population have been presented in Table 85. Fertility, hatchability on total eggs set and hatchability on fertile eggs set respectively were 78, 80 and 62%. Fertility and hatchability decreased in the current generation as compared to previous generation.

Table 85. 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	80.7	95.3	76.9
LC-16	78.0	79.6	62.1
b	**-0.47 NS**	**-0.76 NS**	**-0.58 NS**

Production performance

During the year 2021-22, the birds of LC-16 generation were evaluated up to 40 weeks of age. The performance of control population and their regression value (time trend of control) has been presented in the following Table 86.

Table 86. Performance of layer control population for growth and production traits

Gen.	Body weight (g)		ASM (days)	Egg weight	Egg production (Nos.)	
	16 wks	40 wks		40 wks (g)	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
LC-15	1087	1585	157.3	55.48	90.51	190
LC-16	984.1	1500	148.7	50.96	99.17	-
b	**-2.51 NS**	**7.46 NS**	**0.15 NS**	**0.08 NS**	**1.03 NS**	**3.43 NS**

The traits like body weight at 16 weeks of age, age at sexual maturity, 40 weeks egg weight and egg production to 40 weeks (up to LC-16) showed non- significant change and the control population appears to be stable for all the traits for last ten generations.

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

During the period G-20 generation of the control broiler was evaluated for juvenile traits and G-19 generation for production traits.

Incubation records

Incubation records of G-20 generation in broiler control population have been presented in Table 87. Percent fertility, percent hatchability on total eggs set and percent hatchability on fertile eggs set respectively were 87.75, 84.14 and 95.89. Hatchability was improved in the current generation as compared to previous generation.

Table 87. 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
G-19	88.81	79.74	89.79
G-20	87.75	84.14	95.89

Juvenile body weights

Performance of juvenile traits in control broiler population over 20 generation is presented in Table 88. During the current generation body weight at 5 weeks and 6 weeks of age were 842 and 1072 g, respectively. After six weeks of age 500 female chicks and 150 male chicks representing all the sires and dams were saved and were being maintained under restricted feeding schedule. At the time of housing 2 males per sire family and 2 females per dam family were housed for recording of production traits. The regression estimates of generation mean on generation number for 5 weeks body weight and 6 weeks body weight showed non-significant changes over generations indicating the stability of the broiler control population for juvenile body weights.

Table 88. Performance of juvenile body weights in broiler control population

Gen	BW 5 wks	BW 6 wks
G-1	822	1060
G-2	872	1141
G-3	731	995
G-4	897	1195
G-5	907	1106
G-6	672	891
G-7	592	783
G-8	929	1215
G-9	626	964
G-10	578	829
G-11	522	720
G-12	731	1156
G-13	573	993
G-14	520	663
G-15	570	836
G-16	734	951
G-17	740	930
G-18	755	1042
G-19	788	1056
G-20	842	1072
b	-5.69 ^{NS}	-5.74 ^{NS}

Production traits

A total of 300 females were maintained till 40 weeks of age and recorded for 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 83. The hatching eggs of this population were being supplied to the AICRP-PB 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 89. The regression estimates of generation means on generation number (G-0 to G-19) showed non-significant changes over the generations in all egg production and egg weight indicating the stability of the broiler control.

Table 89. Growth and production performance of broiler control population over the generations

Gen.	BW 20 wks (g)	BW 40 wks (g)	ASM (days)	EW 32 wks (g)	EW 40 wks (g)	EP 40 wks (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
G-18	2197	2882	182	51.96	56.87	46.81
G-19	2535	3177	174	50.65	55.34	78.82
b	**-16.29** ^{NS}	**-21.74** **	**0.98** **	**-0.07** ^{NS}	**-0.07**^{NS}	**-0.09** ^{NS}

Critical Observations

KVASU, Mannuthy

Accomplishments and achievements

1. Mannuthy centre evaluated the native chicken, and IWN and IWP strains of White Leghorn chickens.
2. The age at sexual maturity was 129 and 132 days in IWN and IWP strains, respectively in S-33 generation.
3. Hen-housed egg production up to 72 weeks of age was 292.94 and 278.89 in IWN and IWP strain, respectively. The hen-day and survivors' egg production up to 72 weeks of age were 301.82 and 302.05, respectively in IWN and 293.61 and 293.02, respectively in IWP strain of White Leghorn.
4. IWN X Native (ND) was produced and the cross of ND male with RIR female (NDR) has been produced and evaluated in farm condition up to 72 weeks.
5. The centre supplied a total of 30,238 number of germplasms during the year.
6. The centre has generated revenue of Rs.15.52 lakhs which is 132.4% of the recurring expenditure (feed cost Rs. 11.76 lakhs).

Short falls

1. There is a reduction both in revenue generation and germplasm supply this year. Revenue generation is coming down continuously for last two years.
2. The egg quality studies as mentioned in the technical program is not done this year as well.

Suggestions for further improvement

1. Efforts should be made to increase the revenue generation and germplasm supply.
2. Report of the centre should be carefully prepared with all the relevant data.
3. Egg quality analysis of layer lines needs to be carried out as given in the technical program.
4. Age at 50% and age at peak production (%) must be given for all germplasm.

AAU, Anand

Accomplishments and achievements

1. AAU, Anand centre evaluated the S-2 generation of *Ankleshwar* breed of chicken up to 40 weeks of age.
2. Egg production of *Ankleshwar* chicken (S-2 gen) up to 40 weeks of age was 81.5, which was higher than in S-1 generation (76.4).
3. The S-2 generation of IWN and IWP strains was evaluated up to 72 weeks of age. Egg production up to 72 weeks of age was 303.37 in IWN and 301.73 in IWP strain.
4. The S-3 generation of IWN and IWP strains was produced and is being evaluated.
5. The S-9 generation of IWD and IWK strains was evaluated up to 64 weeks of age. Egg production up to 64 weeks of age was higher in IWD (233.95) than IWK strain (222.58).
6. The centre has supplied a total of 70,311 germplasm during the reporting period.
7. The centre has generated the revenue of Rs. 33.48 lakhs during the reporting year which was 89.14 % of the total expenditure of feed cost (37.56 lakhs).
8. Both germplasm supply and revenue generation have substantially increased as compared to the previous year.

Short fall

1. Egg quality studies as suggested in the technical program is not done.

Suggestions for further improvement

1. Egg quality analysis of layer lines needs to be carried out as given in the technical program.
2. Age at 50% and age at peak production (%) must be given for all germplasm.

KVAFSU, Bengaluru

Accomplishment and achievements

1. Evaluated the performance of native chicken population (S-6), PB-1 (S-14) and PB-2 (S-27) for economic traits.
2. Body weight at 8, 20 and 40 weeks of age was 384.9, 1268 and 1482 g, respectively in local chicken (S-5). The ASM was 165.9 days. The average body weight of day old and 8 weeks of native chicken was 28.20 and 254.6 g, respectively in S-6 generation.
3. Body weights at 5 weeks of age in PB-1 and PB-2 lines was 956.3 and 947.2 g, respectively.
4. PB-1 x PB-2 cross attained 1950 g at 7 weeks of age in field conditions.
5. A total of 1,66,837 germplasms were supplied to 325 beneficiaries.

6. The centre generated revenue of Rs. 46.67 lakhs which is 118% of expenditure on feed cost (Rs.39.59 lakhs).

Shortfalls

1. There is a decline in juvenile growth performance of both PB-1 and PB-2 lines.
2. Mortality is higher during grower and laying phase in PB-1 and PB-2 lines.
3. The data on performance of control population is missing.

Suggestions for further improvement

1. Process of developing of a new location specific variety needs to be given top priority.
2. Steps to be taken to reduce the mortality during grower and laying stage in PB-1 and PB-2 lines.
3. All efforts to be made to improve the juvenile growth and egg production performance in both parent lines.
4. Age at 50% production and age at peak production (%) for all types of germplasm must be given.
5. Results on performance of control population must be given

GADVASU, Ludhiana

Accomplishment and achievements

1. Evaluated the performance of *Punjab Brown* (S-6), PB-1 (S-14), PB-2 (S-46) and cross (PB-2 X Local) for economic traits.
2. Body weight of *Punjab Brown* at 8 and 16 weeks was 669.1, 1541 and 594.6, 1409 g, respectively in male and female. Egg production up to 52 weeks was 100.3 eggs with egg weight of 50.11 g at 36 weeks of age.
3. PB-2 x Native cross was evaluated under farm conditions. The body weight at 4, 8 and 20 weeks of age were 371.3, 840.6 and 1800 g, respectively. ASM and egg production up to 52 weeks was 172 days and 173 eggs, respectively.
4. Average body weight at 5 weeks of age was 1241, 1152 and 968.4 g in PB-1, PB-2 and Control lines, respectively. Egg production up to 40 weeks of age in PB-1, PB-2 and Control lines were 55.02, 56.13 and 51.22 eggs, respectively.
5. Genetic response over last 15 generations for 5 weeks body weight was 12.71 g in PB-1 and 4.88 g in PB-2 population.
6. A total of 85,999 germplasms were supplied to 444 farmers.
7. The centre generated revenue of Rs. 28.36 lakhs which was 118% of expenditure on feed cost (Rs. 24 lakhs).

Shortfalls

1. The body weight of PB-1 and PB-2 lines at 20 weeks of age needs to be maintained between 2150-2200 g for realizing the optimum production during laying phase.
2. Field evaluation of dual cross was not undertaken.

Suggestions for further improvement

1. Field evaluation of dual purpose cross needs to be undertaken.
2. Process of developing of a new location specific variety needs to be given top priority.
3. Report needs to be submitted in time.
4. Age at 50% production and age at peak production (%) must be given for all germplasm.

ICAR-CARI, Izatnagar

Accomplishment and achievements

1. Evaluated the performance of native (S-6), CSML (S-19), CSFL (S-19) and F1 x CSFL cross for economic traits.
2. Body weight of local native chicken germplasm at 16 weeks of age was 1468 g in male and in 1095 g female.
3. Body weight at 6 and 20 weeks of age in the dual-purpose cross (F1 x CSFL) at farm were 1154 and 2818 g, respectively.
4. The body weight at 5 weeks increased in CSML and CSFL lines as compared to previous generation.
5. A total 46,981 germplasm was supplied to the 46 farmers.

Shortfalls

1. Egg production performance of Native, CSML, CSFL and Control lines was not reported.
2. Mortality details in different lines was not reported.
3. Germplasm supply was low

Suggestions for further improvement

1. Egg production performance of native and pure lines needs to be reported.
2. Efforts should be made for proper reporting of results in the annual report
3. Efforts should be made to improve the germplasm supply
4. Report needs to be submitted in time.
5. Age at 50% production and age at peak production (%) must be given for all germplasm.

OUAT, Bhubaneswar

Accomplishment and achievements

1. *Hansli* chicken was evaluated for juvenile traits in S-0 generation.
2. Body weight at 8 and 20weeks of age was 449.6 and 1535 g, respectively.
3. Procured hatching eggs of CSML and CSFL hatching eggs from ICAR-CARI, Izatnagar to regenerate the population.

Short fall

1. Biosecurity measures to prevent outbreak of diseases.

Suggestions for further improvement

1. Population of pure line germplasm needs to be established.
2. Age at 50% production and age at peak production (%) must be given for all germplasm.

ICAR Research Complex, Agartala

Accomplishments and achievements

1. Tripura centre evaluated the *Tripura Black*, Dahlem Red, broiler dam line and their crosses during the year.
2. In E-5 evaluation of BND cross, the 72 weeks egg production was 166.48 eggs under farm and 91.45 eggs up to 52 weeks at farmer's fields.
3. During E-6 evaluation of BND cross, the 40 weeks egg production recorded was 66.16 and 53.22 eggs under farm and field conditions, respectively.
4. The body weight recorded in E-6 at 20 and 40 weeks of age showed slight reduction in comparison to previous (E-5) evaluation under farm.
5. During the period, a total of 28,561 chicks were supplied to 587 farmers of Tripura.
6. The centre realized overall the receipt of Rs.12.24 lakhs which was 68.08% of the expenditure on feed cost (Rs. 17.98 lakhs).

Short fall

1. There is reduction in fertility, hatchability and number of chicks hatched in *Tripura Black* as compared to the previous generation.
2. Mortality during 0 to 6 weeks and growing period (7 to 20 weeks) in *Dahlem Red*, CSFL and BND cross was higher.
3. Body weight of male birds at 20 and 40 weeks of age is missing for all types of birds.
4. Standard error for some traits is missing.
5. Both germplasm supply and revenue generation have come down in this year as compared to the previous year.

Suggestions for further improvement

1. Necessary steps to be taken to develop one variety.
2. Efforts must be made to improve the fertility and hatchability of *Tripura Black* and to reduce the mortality in the populations.
3. Sex wise body weight of adult birds (Hens and cocks) at 20 and 40 weeks must be given. No need to give body weight on pooled sex at these ages in tables.
4. Standard error for ASM must be given.
5. Age at 50% and age at peak production (%) must be given for all germplasm.
6. No need to repeat or present the data in text which is already given in tables.
7. Egg weights at 52 and 72 weeks of age also needs to be recorded if egg production is being recorded up to that age.
8. Efforts must be made to increase both germplasm supply and revenue of the centre.

NDVSU, Jabalpur

Accomplishments and achievements

1. The centre maintained *Kadaknath*, *Jabalpur colour* and *Kadaknath* cross populations.
2. Body weight of *Kadaknath* at 40, 52 and 72 weeks of age was 1500, 1640 and 1905g, respectively and that of and *Jabalpur colour at respective age was* 1940, 2100 and 2710g.
3. Hen day egg production of *Kadaknath* breed up to 40, 52 and 72 weeks of age was 63.0, 93.2 and 116.7 eggs, respectively and that of Jabalpur colour was 93.3, 161.0 and 247.5 eggs, respectively.
4. The *Narmadanidhi* population was evaluated under farm and field conditions up to 52 weeks age.
5. A total of 51,361 chicken germplasm was distributed to 411 farmers.
6. The centre realized a receipt of Rs.30.57 lakhs which was 71.19% of the expenditure on feed cost (Rs. 42.94 lakhs).
7. Both germplasm supply and revenue generation have substantially increased as compared to the previous year.

Short falls

1. Presentation of annual report needs to be improved.

Suggestions for further improvement

1. Age at 50% and age at peak production (%) must be given for all germplasm.
2. Survivors' egg production must be given for the Jabalpur colour and *Kadaknath* populations.

MPUAT, Udaipur

Accomplishments and achievements

1. Udaipur centre evaluated *Mewari*, CSFL, RIR and *Pratapdhan* populations during the year.
2. G-11 generation of *Mewari* breed was evaluated up to 52 weeks of age. The egg production up to 52 weeks of age was 52.46 eggs in *Mewari* chicken.
3. *Pratapdhan* was evaluated for production traits up to 72 weeks of age during E10 generation. The annual egg production (up to 72 weeks of age) was 160.2 in *Pratapdhan*.
4. Germplasm of *Pratapdhan*, a dual-purpose variety was supplied to the needy farmers.
5. A total of 20,108 improved chicken germplasm was distributed to about 353 farmers during the current year.
6. The centre realized Rs 5.45 lakhs 47.70% of the feed cost of Rs 11.43 lakhs.

Short falls

1. Fertility and hatchability of RIR breed is not provided.
2. Mortality in RIR breed during growing and production period is higher (beyond accepted levels). Mortality in BN and BNR (*Pratapdhan*) crosses was also higher during production period (21-40 wks).
3. Both germplasm supply and revenue generation of the centre have come down this year as compared to the previous generation.

Suggestions for further improvement

1. Efforts should be made to improve the germplasm supply and revenue generation.
2. Age at 50% and age at peak production (%) must be given for all germplasm.
3. Egg weights at 72 weeks of age also needs to be recorded if egg production is being recorded up to that age.
4. The body weight of adult male birds of various breeds/ genotypes at 20 and 40 weeks must also be given.

CSKHPKVV, Palampur

Accomplishments and achievements

1. The G-9 generation of native chicken was produced and being evaluated, while G-8 generation from previous year completed the evaluation from 40 weeks onwards. New local germplasm from different locations also being collected.
2. The *Dahlem Red* population (G-7 generation) was evaluated up to 40 weeks of age, while previous evaluation completed for 40-72 weeks period.
3. The *Dahlem Red* X Native (DN) cross birds were produced and evaluated up to 52 weeks
4. The chicks of *Himsamridhi* (DND cross) have been produced and evaluated at farm and field level up to 40 weeks for growth and production parameters.
5. *Himsamridhi* (DND cross) birds from previous year completed evaluation up to 52 weeks at farm and field level.
6. On farm trial (OFT) and Front-Line Demonstration (FLD) for *Himsamridhi* was carried out in collaboration with KVKs in four districts and NGOs in two districts.
7. The centre supplied a total of 70,333 chicks to farmers in different regions of the state including far flung tribal areas.
8. The centre realised the receipts of Rs 19.52 lacks which was 90.92% of expenditure on feed cost (Rs 21.47 lacks) during the current year.
9. Both germplasm supply and revenue generation have substantially increased as compared to the previous year. Fertility and hatchability traits of all genotypes have improved and mortality of all types of birds is low and within acceptable limit.

Short falls

1. Sex wise body weight at 20 and 40 weeks of age is not given.
2. S.E. for AFE and ASM is not given.

Suggestions for further improvement

1. Age at 50% and age at peak production (%) must be given for all germplasm.
2. Egg weights at 72 weeks of age also needs to be recorded if egg production is being recorded up to that age.
3. Standard errors for age at sexual maturity (ASM) must be given.
4. The sex wise body weight of adult (hens and cocks) birds at 20 and 40 weeks must be given.

AAU, Guwahati

Accomplishments and achievements

1. Guwahati centre evaluated native, *Dahlem Red*, PB-2, BN and *Daothigir* populations up to 72 weeks of age.
2. The body weights at 20 and 40 weeks of age were 1161 and 1851 g, respectively in *Daothigir*.
3. The body weight at five weeks was 180.6 g in indigenous, 1221 g in PB-2 and 440.1 g in *Dahlem Red* population.
4. The hen housed egg production of *Kamrupa* up to 72 weeks of age was 155.5 eggs in the farm and 124.3 eggs in the field.
5. The hen housed egg production up to 72 weeks of age was 116.9 eggs in Daothgiri.
6. The centre supplied 44,077 germplasm to 202 farmers
7. The centre realized receipt of Rs. 9.09 lakhs during the financial year which is 45.1% of expenditure on feed cost (Rs.20.15 lakhs).

Short falls

1. Germplasm supply was low.

Suggestions for further improvement

1. Daothgir, native chicken sample size may be increased and the research work may be concentrated on the breed.
2. Age at 50% production and age at peak production (%) must be given for all germplasm.

BAU, Ranchi

Accomplishments and achievements

1. Ranchi centre evaluated native chicken, *Dahlem Red*, PB-2 and Jharsim.
2. The hen day egg production of native population was 102.9 (G9) at 64 weeks of age. Egg weight at 40 weeks of age was 41.57 g.
3. The body weight of *Jharsim* (E-10) under farm conditions at 8, 12 and 16 weeks of age was 472.1, 946.8 and 1439 g, respectively.
4. The egg weight at 40 weeks of age in *Jharsim* (E-9) was 44.28 g. The hen day egg production was 114.02 eggs up to 64 weeks of age.
5. Centre has supplied 39,812 *Jharsim* chicks among 208 farmers, NGOs, KVKs and other agencies.
6. The centre realised a revenue of Rs. 6.26 lakhs during the financial year which was 41.1% of the expenditure on feed cost (Rs. 15.25 lakhs).

Short falls

1. The performance of Jharsim at field condition is not given as suggested in last five years.
2. Germplasm supply was low

Suggestions for further improvement

1. The field performance data of Jharsim should be recorded and presented in the report.
2. Efforts should be made to improve the germplasm supply and revenue generation.
3. Age at 50% production and age at peak production (%) must be given for all germplasm.

9 Poultry Seed Project

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

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

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

Objectives

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

Centres

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

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	ICAR Research complex for NEH Region, Nagaland Centre, Jharnapani	Nagaland
4	ICAR Research complex for NEH Region, Sikkim Centre, Gangtok	Sikkim
5	ICAR Research complex for NEH Region, Manipur Centre, Imphal	Manipur
6	Tamil Nadu Veterinary and Animal Sciences University, Hosur	Tamil Nadu
7	ICAR-Central Coastal Agricultural Research Institute, Panaji, Goa	Goa
8	ICAR-Central Island Agricultural Research Institute, Port Blair, A & N Islands	A & N Islands
9	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	Jammu & Kashmir
10	PVNR Telangana Veterinary University, Warangal	Telangana
11	Sri Venkateswara Veterinary University, Tirupati	Andhra Pradesh
12	ICAR Research Complex for NEH Region, Umiam	Meghalaya

Technical program

- Technical program envisaged for all the centres is same except for the target of supplying chicks/fertile eggs.
- All the centres will procure parents (males of male line and females of female line) of improved chicken germplasm (*Vanaraja*, *Gramapriya* and *Srinidhi*) from the ICAR-Directorate of Poultry Research, Hyderabad. Day old parent chicks will be reared under standard management practices as per guidelines provided in the breeder manual supplied by the Directorate at the respective centre.
- Adult male and female birds will be reared to produce fertile hatching eggs. Day old chicks of the improved germplasm will be hatched and will be reared in the nursery unit or sold to NGOs/ KVKs/farmers for nursery rearing up to 6 weeks of age. The chicks in the nursery unit will be provided with feed, medication, vaccination, brooding, and health care. After the nursery phase, the chicks will be distributed to the individual farmers on cost basis. Wherever possible, the day old chicks / fertile eggs of improved chicken varieties may be distributed to the individual farmers / extension agency / NGO / KVK, who has the facility to grow the birds up to 6 weeks of age in the nursery unit. These birds may be further distributed to the individual farmers at the rate of 10-15 birds per person.
- To know the performance of the birds at farmer's field recording of body weight at 4 weeks intervals during growing (7-20 weeks). Egg production and egg weight at every 14 day intervals during egg laying period (21-72 weeks) will be recorded.
- Analysis, documentation and reporting of the data at regular intervals

Targets for germplasm supply for different centres

S.No	Centre	Target (Nos.)	Achievement (Nos.)
1	Bihar Animal Sciences University, Patna	50,000	41,544
2	West Bengal University of Animal and Fishery Sciences, Kolkata	1,00,000	--
3	ICAR Research complex for NEH Region, Nagaland Centre, Jharnapani	70,000	59,910
4	ICAR Research complex for NEH Region, Sikkim Centre, Gangtok	40,000	70,582
5	ICAR Research complex for NEH Region, Manipur Centre, Imphal	60,000	17,645
6	Tamil Nadu Veterinary and Animal Sciences University, Hosur	1,00,000	98,649
7	ICAR-Central Coastal Agricultural Research Institute, Panaji, Goa	50, 000	31,083
8	ICAR-Central Island Agricultural Research Institute, Port Blair, A & N Islands	50,000	1,200
9	PVNR Telangana Veterinary University, Warangal	50, 000	62,972
10	Sri Venkateswara Veterinary University, Tirupati	50, 000	22,169
11	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	50,000	18,113
12	ICAR Research Complex for NEH Region, Umiam,	50,000	10,211

Bihar Animal Sciences University, Patna, Bihar

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 farmers' fields.
- Analysis, documentation and reporting of the data.

Work done

Parent Stock

During the period under report 150 male and 1080 female day-old chicks of *Vanaraja* have been procured and reared at the centre. The average body weight of the birds at different weeks of age is given in Table 1.

Table 1. Body weight (g) of parent lines at different weeks of age

Age (wks)	*Vanaraja*		*Gramapriya*	
	Male line	Female line	Male line	Female line
0	43.9±0.4	36.9±0.3	43.8±0.3	35.7±0.3
4	370.3±9.9	369.8±8.3	370.1±9.9	365.7±8.3
8	1068±28.2	778.7±20.2	1067±28.2	774.9±20.2
12	1892±46.4	1166±22.7	1893±46.4	1163±22.7
16	2353±59.9	1677±36.5	2351±59.9	1677±36.5
20	3116±62.9	1770±40.2	3115±62.9	1770±40.2
24	3328±74.2	1942±43.3	3324±74.2	1942±43.3
28	3274±0.4	2375±0.5	3273±0.4	2372±0.5
32	3498±8.7	2484±9.1	3499±8.7	2480±9.1
36	3582±26.3	2104±27.1	3582±26.3	2104±27.1
40	3638±46.5	2403±47.6	3638±46.5	2403±47.6
44	3739±50.1	2410±52.4	3739±50.1	2410±52.4
48	3700±49.1	2326±50.5	3700±49.1	2326±50.5
52	3666±62.3	2484±58.7	3666±62.3	2484±58.7
56	3843±65.3	2465±62.7	3843±65.3	2465±62.7
60	4004±60.7	2451±62.5	4004±60.7	2451±62.5
64	3974±62.4	2770±58.4	3974±62.4	2770±58.4
68	3997±59.2	2678±51.3	3997±59.2	2678±51.3
72	3989±62.6	2486±60.6	3989±62.6	2486±60.6

Egg production and Egg weight

A total of 77,022 eggs produced from *Vanaraja* and *Gramapriya* parents during the period. Egg weight was recorded at weekly basis. The average egg weight of *Vanaraja* and *Gramapriya* are presented in the Table 2.

Table 2. Weekly average egg weight (g) of *Vanaraja* and *Gramapriya* parents

	Vanaraja	*Gramapriya*
Age (wks)	Batch XII	Batch XII
39	57.7±0.4	45.76±0.2
40	57.98±0.5	45.03±0.5
41	56.74±0.5	48.24±0.4
42	57.12±0.4	49.00±0.3
43	56.34±0.5	50.46±0.5
44	57.33±0.1	50.7±0.4
45	56.64±0.3	50.38±0.3
46	57.72±0.4	50.01±0.5
47	56.84±0.4	51.56±0.6
48	58.32±0.3	52.32±0.5
49	57.56±0.4	54.06±0.8
50	58.55±0.4	51.57±0.7

Fertility and hatchability

A total of 78059 eggs were set in the incubator during the period under report and total 39450 day old chicks were produced. Fertility of *Vanaraja* and *Gramapriya* birds was 71.24% and 77.42%, respectively. Hatchability on TES and FES for *Vanaraja* was 46.38 % and 66.23% respectively, and for *Gramapriya* were 38.39% and 63.66%, respectively during the period.

Germplasm supply and Revenue Generation

A total of 41544 commercial chicks were distributed to 977 farmers during the period under report. Out of total chicks distributed 11289 were the day-old chicks of *Vanaraja* and *Gramapriya* received by the progressive farmers and rest were the grown-up chicks. Most of the agency/farmers usually prefer to take grown up chicks after completion of brooding stage. Nursery birds at the age of 5-6 weeks were distributed among the farmers through various agencies like ATMA and KVKs to promote backyard poultry farming in the state. Birds were distributed through KVKs & NGOs. Birds were also distributed among the farmers through Agricultural Technology Management Agency

(ATMA) in the naxalite affected areas of Jehanabad and Gaya districts. Demonstration and training programmes were organized by the PSP, BVC, Patna with the help of ATMA for adoption of this project among the farming community. Birds have also been supplied to the farmers of Chatra, and Hazaribagh district in Jharkhand. A sum of total Rs. 20,48,527 was generated through sale of commercial chicks and fertile eggs.

Field performance and feedback from beneficiaries

The farmers reared the *Vanaraja* and *Gramapriya* birds under intensive, semi intensive and extensive system but it was mostly backyard free range system. Under intensive system they used to maintain the birds in the pens made up of bamboo and wire net. The birds were allowed to maintain under extensive system of rearing. Mortality of chicks up to 3 months of age was a great concern as reported by the farmers. Coccidiosis was the major problem faced by the farmers. Poultry farming is becoming popular enterprise in this state. The SHG members were 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 were sold usually at the rate of Rs. 14 – 18 per egg. Birds were sold at the rate of Rs. 250-300 per kg live weight basis. The farmers were increasing their livelihood of the family. The farmers were satisfied on the performance of *Vanaraja* but they were concerned with the mortality of birds. The farmers were also trained in Poultry Farming through, NASF, SCSP, ATMA and Farmers First Project of different districts of Bihar.

Constraints

- There should be some budgetary provision for training and awareness activities for sustainable adoption of farming practices.
- During the month of December and January, in general, farmers do not prefer to take chicks due to severe cold.
- The high cost of poultry feed is another problem faced by the Centre. Hence, the budgetary provision towards contingency is essentially required to be enhanced to some extent towards purchase of sufficient quantities of feed so that the project may be run smoothly.

ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapani

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 farmers' fields.
- Analysis, documentation and reporting of the data.

Work done

Parent Stock

During the reporting year one batch of parent stock of *Vanaraja* was procured and maintained under deep litter system. The weekly body weight and the mortality pattern was recorded and presented below in Table 3.

Table 3. Body weight (g) records of *Vanaraja* and *Srinidhi* parent line

Age (wks)	*Vanaraja* male XIII	*Vanaraja* female XIII	*Srinidhi* male VII	*Srinidhi* female VII
Initial	39.9±0.8	32.8±0.6	33.8±1.1	30.±1.1
1	95.5±1.8	82.9±1.8	71.2±2.1	48.6±1.8
2	112.5±2.9	119.5±2.6	165.5±3.1	94±1.7
4	285.7±10.7	240±7.7	326.8±8.4	207±3.6
6	550±22.9	366.8±12.3	399.8±14.2	270.2±5.9
8	722.2±20.6	579.2±17.6	632.8±25.5	346.3±9.9
10	1011±33.9	813.3±22.1	757.8±20.1	479.3±12.4
12	1198±41.6	1135±25.3	1179±22.6	625.5±15.4
14	1424±47.9	1263±32.9	1538±26.1	771.8±13.6
16	1696±42.5	1430±4	1930±37.4	937.8±21.5
18	1920±33.9	1596±41.1	2336±48.1	1108±18.1
20	1756±56.2	1709±40.9	2629±74.1	1143±28.1

Egg production

The hen house egg production performance is mentioned on weekly basis for *Vanaraja* and *Srinidhi* parent line in Table 4.

Table 4. Egg production (HHEP) in parents of *Vanaraja and Srinidhi*

Age (wks)	*Vanaraja*	*Srinidhi*
28	45.93	20.43
32	61.37	14.58
36	27.45	25.74
40	52.03	38.66
44	49.86	43.97
48	45.09	45.5
52	27.65	42.15
64	25.95	31.34
72	36.18	25.7

Hatching performance

The average fertility was 69.03% and hatchability on TES and FES were 45.36% and 65.55% respectively in *Vanaraja* parents. The average fertility was 72.3% and hatchability on TES and FES were 57.52% and 71.54% respectively in *Srinidhi* parents.

Germplasm supply and Revenue Generation

During the reporting year altogether 59910 chicks were supplied to a total of 830 beneficiaries including farmers, KVKs, NGOs working in Nagaland and neighbouring states. Under the Tribal Sub Plan 538 beneficiaries were covered from Noklak, Kiphire, Kohima, Peren, Dimapur, Mon, Mokokchung and Phek districts in Nagaland and 15273 day old 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 and obtained encouraging results. A total of Rs. 29,39,045 revenue generated through sale of chicks and eggs during the period.

Constraints

- Urgent requirement of another setter, as there is only one setter which when malfunctions create inconveniences.
- Requirement of incinerator for disposal of hatchery wastes.
- Lack of layer house because of dismantling of old poultry shed in lieu of expansion of national highway.

ICAR Research Complex for NEH Region, Sikkim Centre, Gangtok

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 farmers' fields.
- Analysis, documentation and reporting of the data.

Work done

Parent Stock

One batch of *Vanaraja* parents were reared during the period at the centre. The body weight of male and female parents of *Vanaraja* at 20 weeks of age is given in below Table 5.

Table 5. Body weight (kg) of *Vanaraja* parents

Age (wks)	Male line	Female line
4	0.253	0.193
6	0.636	0.563
12	1.188	1.172
16	1.593	1.478
20	2.127	1.908
24	2.588	2.308

Egg production

The average HDEP in *Vanaraja* of batches 11th and 12th is given below in Table 6.

Table 6. Egg production (%) in *Vanaraja* parent birds

Age (wks)	11th Batch	12th Batch
28	28.69	28.25
36	57.66	65.81
40	63.88	64.44
52	44.50	57.00
64	59.29	25.06
72	46.09	52.57
80	29.39	

Hatching performance

The average fertility and hatchability (TES) in *Vanaraja* female line of the two batches were 89.31% and 72.21%, respectively.

Germplasm supply and Revenue generation

A total of 70582 chicks were supplied during the period in which 52706 chicks supplied under Tribal Sub Plan. There were 465 villages covered and 2155 farmers benefited through the centre during the period. Out of the total beneficiaries 2103 were tribal farmers. An amount of Rs. 43,84,656/- revenue was generated by supplying germplasm during the period.

Constraints

No constraints were reported in the period.

ICAR Research Complex for NEH Region, Manipur Centre, Imphal

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 farmers' fields.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

During the reporting year a batch of *Vanaraja* and *Srinidhi* parent stock were maintained under deep litter system. The average body weight was recorded after every four weeks till 56 weeks of age was recorded and presented in Table 7.

Table 7. Body weight (g) of *Vanaraja* and *Srinidhi* birds at different age

Age (wks)	*Vanaraja* (16th batch)		*Srinidhi* (16th batch)	
	Male line	Female line	Male line	Female line
4	457.2±0.3	314.5±2.1	422.8±0.8	244.7±6.5
8	1164±1.2	753.5±1.9	1271±12.2	631.4±1.8
12	1475±2.5	976.2±4.3	1536±0.9	851.4±7.8
16	2265±10.6	1367±2.5	1626±0.8	985.4±1.7
20	2321±10.1	1704±2.1	1685±1.1	1170±4.8
24	2399±9.1	1792±4.1	1308±0.9	1285±5.1
26	2422±8.7	1804±1.3	1485±2.3	1373±5.5
30	2467±8.3	1863±2.4	1923±0.9	1477±7.7
34	2590±7.1	1950±2.1	1995±1.1	1594±1.7
36	2676±6.9	2014±2.2	2039±25.2	1680±6.3
40	2714±6.7	2115±2.1	2133±0.8	1754±7.1
44	2784±5.1	2214±1.8	2196±0.8	1823±1.9
46	2802±8.1	2296±1.1	2197±2.3	1871±6.7
50	2845±8.2	2364±1.3	2133±0.8	1930±3.8
54	2867±7.7	2417±2.5	2195±1.9	2072±7.5
56	2901±5.2	2496±1.6	2192±3.4	2125±8.1

Hatching Performance of birds

The percent fertility and hatchability on TES of the *Vanaraja* parent stock maintained during the period is 83.11 and 65.81 respectively.

Germplasm supply and Revenue generation

During the reporting period 17,645 chicks have been supplied to different parts of the state. Revenue generated was Rs 13, 32, 280 during this reporting time

Field performance and Feedback from the farmers

The performance data of *Vanaraja* and *Srinidhi* birds under farmer's field were collected from the farmers randomly. The production record and performance of birds in various parts of the Manipur districts in terms of their body weight gain, feed efficiency, egg weight and shank length in field condition was recorded. Along with the birds, other requirements like feed, medicine and feed supplement were also given to the beneficiaries. The main reason of mortality during initial phase in farmers' field was irregular or insufficient electricity supply which is required for brooding of chicks and disease like coccidiosis, respiratory infection and endoparasite infestation and a higher rate of disease incidence was also observed where the beneficiaries did not follow the timely health cover and maintained properly.

Table 8. Average body weight (g) of *Vanaraja* and *Srinidhi* birds at different ages

Parameters	*Vanaraja*		*Srinidhi*	
Age (wks)	Male	Female	Male	Female
4	374.3	315.4	335.6	254.5
8	897.2	694.2	823.6	587.2
12	1543	898.6	1457	829.5
16	1875	1390	1712	1168
20	2678	1602	1898	1167

Table 9. Performance parameters of *Vanaraja* and *Srinidhi* birds

Parameters	*Vanaraja*		*Srinidhi*	
	Male	Female	Male	Female
Egg weight (g)	-	55.8	-	53.4
Shank length (cm)	8.6	7.2	8.6	5.9

Constraints faced during the reporting period:

- The parent stock started laying from the month of July, 2021, hence the chicks started hatching out from the month of August, 2021 onwards so the chick production record was from August, 2021 to March, 2022.
- Since the incubator is old, there is problem faced in operating the machine which needs constant repairing from time to time.
- There was an outbreak of Ranikhet disease in the month of February 2022 which resulted death of few birds.

Tamil Nadu Veterinary and Animal Sciences University, Hosur, Tamil Nadu

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 farmers' fields.
- Analysis, documentation and reporting of the data.

Work done

Parent stock

One batch (V batch) of *Vanaraja* and *Gramapriya* parents were reared at CPPM, Hosur during the reporting period and the batch was in layer phase between 36 and 89 weeks of age. Similarly, one batch (VI batch) of *Vanaraja* was reared and the batch was in chick phase between day old and 7 weeks of age. A total of 295 (38 male and 257 female) and 384 (58 male and 326 female) parents of *Vanaraja* and *Gramapriya* at layer phase, respectively and 692 parents of *Vanaraja* at chick phase (112 male chicks and 580 female chicks) were in position, at the end of reporting period.

Egg production

The hen day and hen housed egg production of V batch of *Vanaraja* and *Gramapriya* are presented in Table 10. The hen day egg production ranged from 74 to 46% during 36 – 72 weeks of age with hen housed egg production of 184 at 72 weeks of age in *Vanaraja*. Similarly, the hen day egg production ranged from 59 to 50% during 36 – 72 weeks of age with hen housed egg production of 125 at 72 weeks of age in V batch of *Gramapriya*.

Hatching performance

The fertility in V batch *Vanaraja* parent ranged from 88 to 81 per cent and hatchability (TES) ranged from 70 to 84 per cent. Similarly, the fertility varied from 84 to 76 per cent and hatchability (TES) ranged from 81 to 61 per cent in *Gramapriya* (V batch) parents.

Germplasm supply and Revenue generation

A total of 98,649 improved rural chicken germplasm of *Vanaraja* and *Gramapriya* were distributed to 1,725 beneficiaries including farmers and entrepreneurs throughout Tamil Nadu during 2021-22. The Centre has generated total revenue of Rs. 27.99 lakhs during 2021-22. Month wise distribution of germplasm is presented in Table 11.

Table 10. Egg production in *Vanaraja* and *Gramapriya* parents

Age (wks)	*Vanaraja* (IV batch)		*Gramapriya* (IV batch)	
	HDEP (%)	HHEP (No.)	HDEP (%)	HHEP (No.)
40	74.3	69.4	58.5	35.2
44	62.4	87.5	57.2	48.7
48	62.0	103.4	52.0	60.7
52	62.9	120.4	55.9	73.0
56	61.1	136.1	53.4	84.6
60	56.5	150.7	53.2	95.8
64	46.4	163.9	56.2	106.4
68	35.1	174.4	49.4	116.2
72	46.9	184.2	57.1	125.2
76	46.3	194.9	53.2	133.5
80	39.6	205.4	39.8	140.1
84	42.3	214.9	51.0	147.0
88	42.3	225.7	48.0	153.1

Feedback from farmers

Farmers rearing *Gramapriya* chicken were contacted for feedback and the hatch weight of *Gramapriya* chicken were reported to be 30.25 g and with age at first egg as 175 days. Livability per cent during 0-12 weeks was 94 with average egg weight of 52.7 g and hatchability of 82%. The egg production was reported to be 155 under semi-intensive system of rearing.

Constraints

No constraints were reported in the period.

Table 11. Month wise distribution of the germplasm

Month	Germplasm supply (No)			Number of beneficiaries	Revenue generation (Rs.)
	Gramapriya	*Vanaraja*	Total		
April 2021	5328	2400	7728	102	1,96,768
May 2021	3889	2792	6681	85	2,71,797
June 2021	1109	869	1978	39	1,20,891
July 2021	8030	4008	12038	206	4,93,532
August 2021	9757	4927	14684	217	3,53,906
September 2021	6779	2310	9089	114	2,83,748
October 2021	6719	3489	10208	181	1,91,043
November 2021	6226	3107	9333	190	1,38,437
December 2021	5686	1865	7551	159	2,57,307
January 2022	5850	2901	8751	186	1,77,277
February 2022	3368	1885	5253	131	1,57,720
March 2022	3475	1880	5355	115	1,56,705
Total	**66,216**	**32,433**	**98,649**	**1,725**	**27,99,131**

ICAR-Central Coastal Agricultural Research Institute, Goa

Activities assigned

- Maintenance of parent stock for continuous supply of fertile eggs and chicks of improved chicken varieties for rural and tribal farmers
- Extending the germplasm supply to nearby coastal states
- Recording the performance of parents in the institute farm, analysis and documentation

Work done

Parent stock

The average weekly body weights of *Gramapriya* female birds at hatch, 4th and 7th week, 14th, and 20th were 32.3 gm, 213.3 gm and 401.8 gm, 840.1gm and 1556.6 g whereas 36.7 gm, 484.4 gm, 96.83 gm, 167.35 gm, 213.35 gm and 401.90 gm for males. The age at sexual maturity was 139 days with body weight of 1.5 kg for females and egg weight of 41 gm. This *Gramapriya* parent stock is 22 weeks old and now at 5% of initial egg production.

Germplasm supply

Total 31,083 germplasm was supplied to1244 farmers of Goa, Karnataka and Maharashtra with appx revenue of Rs. 5,31,080.

Feedback from the farmers' field

The performance of *Gramapriya* birds in the farmers' fields were recorded and presented in the Table 12.

Table 12. Performance of poultry birds in farmers' field

Age (wks)	Body weight (g)	Mortality (%)
6	648-750	2
8	1038	1
At the time of marketing	1.5 kg	2-3

The major constraints faced by poultry farmers were high feed cost, inadequate govt. support, non-availability of stocks, climate issues, non-availability of skilled labourer and predator attack. Hence technological intervention was made in respect to quality egg production, incubation-hatching, feed formulation, feed storage, housing for high rainfall area and breeding of germplasm through demonstrations and interactions.

ICAR-Central Island Agricultural Research Institute, Port Blair, A & N Islands

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

A total of 55 Nicobari fowl breeders entered into laying phase and 3000 hatchable eggs were produced and 1007 chicks were produced and the parent stock is in growing stage.

Germplasm supply

A total of 1200 hatchable eggs from Nicobari fowl has been distributed to 50 farmers.

ICAR Research Complex for NEH Region, Umiam, Meghalaya

Activities assigned

a. Construction of civil works

b. Maintenance of parent stock for continuous supply of fertile eggs, chicks of improved chicken varieties

c. Recording the growth and reproductive performance in *Vanaraja* parent lines

d. Collection of data on performance of *Vanaraja* birds from farmers' field and reporting their feedbacks.

Work done

Parent stock

One batch of *Vanaraja* parent stock was procured and reared under deep litter system in the institute farm for production and supply of improved varieties of chicks.

The growth and reproductive performances of *Vanaraja* parent lines were recorded and given in Tables 13 and 14.

Table 13. Body weights (g) in *Vanaraja* male and female lines

Age (wks)	*Vanaraja* Parent lines	
	Male	Female
0	39.5±0.4	37.2± 0.5
4	449.2±10.5	322.7 ± 5.2
8	1183± 10.7	869.9± 18.8
12	1679 ± 19.5	1245 ± 19.4
16	1845 ± 95.5	1586 ± 86.4
20	2989 ± 100.2	1674 ± 90.4

Table 14. Reproductive performance of *Vanaraja* parent lines

Traits	Values
Average HDEP from 52-72 weeks (%)	24.9±1.1
Average egg weight (g) from 52-72 weeks	58.4±0.8
Fertility (%)	86.3±1.2
Hatchability on TES (%)	57.9±1.4
Hatchability on FES (%)	67.4±1.9

Feedback from the field

The performance of *Vanaraja* birds in the farmers' fields and the farmers feed backs were recorded. The performance of *Vanaraja* birds recorded up to 52 weeks was found to be optimum (Table-15). The major diseases recorded in the farmers' fields were Coccidiosis, Bacillary white diarrhoea, Infectious coryza etc. particularly during summer seasons, although overall survivability rate of *Vanaraja* birds from 6 to 20 weeks was found to be good.

Table 15. Growth and mortality records of *Vanaraja* birds at farmers field (Mean±SE)

Traits	Values
Body weights (g)	
6 wks	516.2±13.9
8 wks	596.1±19.2
12wks	918.6±34.6
16 wks	1183±38.6
20 wks	1475±47.1
Mortality (%) from 6 to 20 weeks	8.6±0.6
Age at First Egg (days)	177.7±1.8
Hen Day Egg Production (%) up to 52 wks	31.8±2.2
Egg weight (g) at 32 wks	45.9±0.1
Egg weight (g) at 40 wks	52.3±0.1
Egg weight (g) at 52 wks	56.9±0.1

The majority of the farmers are rearing the birds under backyard system, although few farmers rear them under intensive system and are earning their livelihood through selling of birds and eggs. The selling price of live birds and eggs are reported to be ranged from Rs. 250 -350 per kg and Rs. 12-15 per egg respectively. The overall acceptability and demand of *Vanaraja* birds is increasing among the rural farmers and consumers in the region.

Germplasm supply

Total of 10,211 chicks were supplied to 317 numbers of beneficiaries in the Meghalaya and revenue of Rs.10,83,501/- was generated during period.

Under the TSP component of the Poultry Seed Project, three numbers of farmers training and field day cum demonstrations were organized. A total of 6020 numbers of *Vanaraja* chicks along with feeding and watering troughs, feed, medicines etc. were provided to 266 numbers of tribal farmers from different districts of Meghalaya during the period.

Constraints

The procurement of parent stocks for timely replacement of stocks could not be made due to Covid-19 pandemic which hampered the targeted chick production and supply.

Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar, J & K

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.

Work done

Parent Stock

This centre maintained two batches of *Vanaraja* parents during the year. Stock I had 210 males 920 females and Stock II had 95 males and 385 females of 16 weeks at 31.3.2022. The body weights of male and female parents at different ages are provided in Table 16. The average body weight was recorded after every four weeks till 20 weeks of age and presented in Table 17.

Table 16. Body weight (g) of *Vanaraja* parent stock

Age (wks)	Male	Female
0 day	41.9±4.7	35.1±3.6
4	401.3±12.5	347.6±10.6
8	875.7±32.3	539.5±27.4
12	1346±53.4	886.6±36.7
16	1789±76.9	1110±65.4
20	2413±87.8	1967±68.8
24	2642±91.1	2203±76.2
28	2774±98.2	2307±79.6
32	2967±101.8	2414±85.2
36	3124±104.1	2470±93.7
40	3437±115.1	2575±103.1
44	3229±107.1	2521±99.7
48	3001±94.1	2453±90.1
52	2972±97.8	2313±97.7
56	2955±89.6	2278±88.8

Table 17. Body weight (g) of *Vanaraja* parent stock up to 15 weeks of age

Age (wks)	Male	Female
0	42.6 ±5.2	36.8±4.3
2	249.4 ±11.8	210 ±9.6
3	335.2 ±18.2	270.8±15.3
4	462.7±28.6	394.8±22.6
5	695±34.4	519.7±28.2
6	1030±59.1	680.7±38.6
7	1156 ±65.7	884±48.5
8	1605±73.2	1124 ±61.5
9	1652 ±76.8	1264±69.9
10	1932±88.1	1332±73.1
11	2113±91.5	1326±68.3
12	2377±97.9	1361 ±78.4
13	2728 ±100.7	1791±81.6
14	2841 ±103.1	2005±89.8
15	3050 ± 98.7	2386±91.3

Egg Production

The egg production of the parent birds maintained at the center is provided in Table 18.

Table 18. Egg production of parent stock

Month	Age (wks)	HDEP (%)
Apr	21	5.61
May	25	41.62
Jun	29	50.62
Jul	33	44.73
Aug	37	47.11
Sep	41	45.01
Oct	45	1.34*

* Temperature dip due to approaching winter in Srinagar

Hatching Performance

The information on hatchability of eggs from *Vanaraja* parents are presented in Table 19. The highest hatchability (TES) was 82.16%.

Table 19. Hatching performance of *Vanaraja* parents

Eggs from Parent Stock received on 14/10/2020.

Month	Parent's age (wks)	Hatch No.	HTES%
May	28	1	30.85*
		2	10.27*
		3	67.76
		4	81.14
		5	67.27
Jun	32	6	75.33
		7	68.56
		8	62.12
Jul	36	9	82.16
		10	71.78
		11	68.33
		12	75.45
Aug	40	13	60.88
		14	64.08
		15	67.78
		16	65.51
Sep**	44	17	64.67
		18	65.76

* Temperature control failure of setter machine

** Sever drop in egg production due to winter

Germplasm supply

A total of 18,113 germplasm was distributed to farmers of Jammu and Kashmir during the year and generated Rs. 6,96,876 as revenue by sale of chicks and eggs during the period.

Tribal Sub-Plan Activities

TSP program was conducted in the district Kargil of UT Ladakh. Five hundred *Vanaraja* chicks of 3-4 weeks old were distributed along with 20 kgs of feed and medicine kits to 52 farmers identified by KVK and MARV& ES in Kargil, Ladakh. In Kashmir province, a total of 2440 chicks were supplied along with 20 kgs of feed and medication kits to 334 farmers identified by their respective KVK and PSP-SKUAST-K, suppling a total of 7030 kg of feed to the farmers in the Kashmir division. A total of 2940 chicks and 8070 kg feed were distributed to 386 tribal families of J&K and Ladakh UT under the PSP-SKUAST-K Tribal Sub Plan.

Sri Venkateswara Veterinary University, Tirupati, A.P.

Activities Assigned

- Rearing of parents and supply of fertile eggs and chicks
- Supply of chicks under SCSP programme
- Construction of vaccination room for chicks

Work done

Civil works

Construction of fumigation room completed.

Parent stock

During the current year existing batch parent birds (3rd batch) are being maintained for germplasm supply and a total number of 400 day old parent chicks of *Vanaraja* were received as replacement stock (4th batch).

The average body weights of present batch (4th batch) of *Vanaraja* at 8 weeks of age were 253 and 210 g in male and female birds respectively. The average body weights of male and female parent birds of 3rd batch at 78 weeks were 3695 and 2836 g respectively. The body weights of parent birds of 3rd and 4th batch were given in Table 20. The hen day egg production during 34 - 78 weeks period ranged from 63.23 to 47.59% and the hatchability ranged from 31 to 78% (Table 21).

Table 20. Body weights (g) of *Vanaraja* parents

Age (wks)	Male (g)	Female (g)	Age (wks)	Male (g)	Female (g)
	3rd batch		4th batch (Now present)		
34	3219±132.4	2493±168.6	0 Day	38.9±6.2	37.2 ±8.1
38	3259±295.9	2519±105.5	4	186.8±24.7	171.9 ±31.2
42	3299±196.6	2571±77.6	8	253.5±78.1	210.8 ± 66.1
46	3350±123.1	2584±58.4			
50	3398±1723.2	2600±141.3			
54	3442±245.6	2622±193.7			
58	3480±310.1	2689±210.5			
62	3501±202.9	2705±143.8			
66	3552±256.8	2722±163.3			
70	3594±136.5	2772±121.4			
74	3625±221.62	2804±205.1			
78	3695±356.9	2836±201.1			

Egg Production

Table 21. Production performance of parents (3rd batch)

Age (wks)	Egg wt (g)	HDEP (%)	Hatchability (%)
34	51.8	63.2	78
38	52.4	75.5	86
42	53.8	86.6	83
46	54.2	82.2	81
50	54.7	79.4	77
54	54.9	71.8	69
58	55.2	67.3	61
62	55.8	64.2	54
66	56.3	56.4	47.
70	56.6	51.7	42
74	56.7	49.9	36
78	56.9	47.6	31

Germplasm supply

A total number of 22,169 germplasm were supplied to 441 farmers. An income of Rs. 2,38,907/- was generated by sales of chicks, eggs and birds.

A total of 450 birds were distributed to SC farmers under DAPSC. Along with birds, feed, feeders, waterers and crates were also distributed.

PVNR Telangana Veterinary University, Livestock Research Station, Mamnoor, Telangana

Activities assigned

- To take up the pending civil works on priority with regards to construction of hatchery.
- Maintenance of parent stock for continuous supply of fertile eggs, day old germplasm / growers *(Gramapriya variety* and improved native chicken – *Vanashree*).
- Recording the growth, production, fertility and hatchability in parents / commercials.
- Analysis, documentation & reporting of the data.

Work done

Parent Stock

The availability of different parent stocks (*Gramapriya* and Aseel) and improved native chicken commercials (*Vanashree*, PD4, *Kadaknath* and Ghagus) for the reporting period at the centre is provided in Table 22.

Table 22. Stock position of *Vanashree, Gramapriya* parents, *Kadaknath, Ghagus,* and *Aseel* cross

S.N	Stock	Stock as on April, 2021			Mortality		Sale		Stock as on March, 2022		
		Age (wks)	Male	Female	Male	Female	Male	Female	Male	Female	Age (wks)
1	*Vanashree*	71	65	212	-	11	65	201	-	-	-
2	*Gramapriya* (2nd batch)	57	39	158	7	15	32	143	-	-	-
3	*Vanashree*	27	85	99	3	9	36	-	46	90	78
4	*Gramapriya* (3rd batch)	23	154	1026	10	131	104	661	40	234	74
Stock received after April, 2021											
5	*Vanashree*	-	34	36	1	4	-	-	33	32	*47*
6	*Aseel*		32	25	-	6	-	-	32	19	
7	*Kadaknath*	-	57	71	9	2	-	-	48	69	*34*
8	*Ghagus*		14	45	1	1	-	-	13	44	
9	*Aseel*		15	18	-	11	-	-	15	7	
10	*Vanashree*		60	50	6	3	3	-	51	47	
11	*Gramapriya* (4th batch)	-	189	700	30	23	-	-	159	677	*22*

The body weights of the above parents, commercial stock and improved native chicken are presented in Table 23 and 24.

Table 23. Body weight (g) of *Vanashree, Gramapriya* parents and *Aseel* cross

Age (wks)	*Vanashree*		*Gramapriya* parents 3rd batch		*Vanashree*		*Aseel cross*	
	Male	Female	Male	Female	Male	Female	Male	Female
4	-		-	-	0.34 ± 0		0.23 ± 0.0	
8	-		-	-	0.6 ± 0		0.45 ± 0.0	
12	-		-	-	0.08 ± 0		0.78 ± 0.0	
20	-	-	-	-	2.5 ± 0.1	2.0±0.1	1.9 ± 0	1.7 ± 0
40	2.8± 0	2.1 ± 0	2.7 ± 0.1	1.5 ± 0.0	2.7 ± 0.0	2.3 ± 0	2.3 ± 0	2.1 ± 0

Table 24. Body weight (g) of *Vanashree, Kadaknath,* Ghagus, Aseel cross and *Gramapriya* parents

Age (wks)	*Kadaknath*		*Ghagus*		*Vanashree*		*Aseel*		*Gramapriya* parents 4th batch	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
4	0.3 ± 0.0		0.34 ± 0.0		0.38 ± 0.0		0.29 ± 0.0		0.23 ± 0.0	
8	0.55 ± 0.0		0.45 ± 0.0		0.99 ± 0.0		0.55 ± 0.0		0.73 ± 0.0	
12	0.89 ± 0.0		0.85 ± 0.0		0.94 ± 0.0		0.78 ± 0.0		1.52 ± 0.0	
20	2 ±0	1.3 ± 0	2.1± 0	1.4 ± 0	2 ± 0	1.5 ± 0	1.8 ± 0	1 ± 0	2.63±0	2.12± 0

Egg production

The egg production of different birds maintained at the centre is provided in Table 25.

Table 25. Production performance of *Vanashree* and *Gramapriya* parents

Traits	*Vanashree*	*Gramapriya* parent 2nd batch	*Vanashree*	*Gramapriya* parent 3rd batch	*Vanashree* 1st batch
EP (%) 32 wks					
HH	-	-	29.4	28.2	21.8
HD	-	-	29.4	32.8	2.4
EP (%) 40 wks					
HH	-	-	29.8	31.6	34.3
HD	-	-	30.2	32.2	15.40
EP (%) 52 wks					
HH	-	-	32.9	28.3	-
HD	-	-	33.3	37.3	-
EP (%) 64 wks					
HH	-	12.1	28.1	28.9	-
HD	-	19.5	28.7	39.8	-
EP (%) 72 wks					
HH	16.6	9.1	7.9	10.9	-
HD	23.3	15.2	8.4	19.6	-
Egg weight (g)					
32 wks	-	-	49.5 ± 0.2	52.5 ± 0.1	49.0 ± 0.2
40 wks	-	-	53.7 ± 0.2	54.5 ± 0.1	53.2 ± 0.2
52 wks	-	-	54.4 ± 0.2	53.8 ± 0.1	-
64 wks	-	52.4 ± 0.1	55.1 ± 0.2	55.2 ± 0.1	-
72 wks	54.3 ± 0.1	51.7 ± 0.1	55.3 ± 0.2	55.1 ± 0.1	-

Table 26. Production performance of *Aseel cross, Kadaknath, Ghagus,* and *Vanashree*

Traits	*Aseel* cross 1st batch	*Kadaknath*	*Ghagus*	*Aseel* cross 2nd batch	*Vanashree* 2nd batch
EP (%) 32 wks					
HH	5.0	56.5	59.0	25.0	23.4
HD	2.0	15.4	14.9	12.5	17.6
Egg weight (g)					
32 wks	50.3 ± 0.3	51.2 ± 0.2	49.8 ± 0.2	50.3 ± 0.2	51.3 ± 0.2
40 wks	54.2 ± 0.2				

Hatching performance

The hatching performance of parents (*Gramapriya*), commercial stock (*Vanashree*) and native chicken (*Kadaknath*, Ghagus, PD4 and Aseel cross) in terms of fertility and hatchability is presented in Table 27 and 28.

Table 27. Hatching performance of *Vanashree and Gramapriya*

Age (wks)	*Vanashree*			*Gramapriya* 2nd batch			*Vanashree*			*Gramapriya* 3rd batch			*Vanashree* 1st batch		
	F	H		F	H		F	H		F	H		F	H	
		TES	FES		TES	FES		TES	FES		TES	FES		TES	FES
28	-	-	-	-	-	-	90.0	71.3	79.2	43.1	19.4	45.2	40.6	18.8	46.2
36	-	-	-	-	-	-	92.7	83.3	89.8	88.9	63.1	71.6	88.0	52.0	59.1
40	-	-	-	-	-	-	95.1	82.5	86.7	91.2	72.1	79.1	94.2	76.9	81.6
52	-	-	-	-	-	-	94.4	81.3	86.1	86.7	77.4	89.3	-	-	-
72	85.5	51.4	60.2	88.8	68.4	76.9	87.9	68.9	78.4	88.4	74.2	83.9	-	-	-

F: Fertility in %, **H**: Hatchability in % **TES:** Total eggs set, **FES**: Fertile eggs set

Table 28. Hatching performance of *Kadaknath, Ghagus* and *Aseel* cross

Age (wks)	*Aseel* 1st batch			*Kadaknath*			*Ghagus*			*Vanashree* 2nd batch		
	F	H		F	H		F	H		F	H	
		TES	FES		TES	FES		TES	FES		TES	FES
28	25.0	25.0	100	74.3	55.0	74.04	93.6	75.8	81.1	87.1	76.3	87.6
36	89.9	45.3	50.3	-	-	-	-	-	-	-	-	-
40	46.2	38.5	83.3	-	-	-	-	-	-	-	-	-

F: Fertility in %, **H**: Hatchability in % **TES:** Total eggs set, **FES:** Fertile eggs set

Table 29. Month wise supply of the germplasm and revenue generation

Month wise for the year 2021	Germplasm supply (Nos.)	Revenue generation (Rs.)	Farmers benefitted (Nos.)
April	1,865	62,311	12
May	2,270	65,490	13
June	4,182	1,12,270	13
July	6,448	1,57,340	17
August	5,679	1,34,800	16
September	6,504	1,56,390	21
October	5,976	1,43,190	22
November	4,388	1,07,680	15
December	7,112	1,74,410	22
Jan, 2022	8,467	1,92,880	21
Feb, 2022	5,960	1,39,185	13
Mar, 2022	4,121	1,17,650	18
Total	**62,972**	**15,63,596**	**203**
Sale of culled birds and eggs	-	1,26,709	-
Grand Total	**62,972**	**16,90,305**	**203**

Germplasm supply

A total of 62,972 germplasm supplied to 203 farmers and revenue generated Rs. 16,90,305.

Constraints

To maintain proper biosecurity measures, scientific rearing and to expand the production capacity there is a need to construct an elevated platform cage house for parent layer stock.

12 Critical Observations

BAU, Patna

Accomplishments and achievements

- Two batches of parents were reared
- Supplied 41544 germplasm to farmers
- Generated Rs. 20.48 lakhs of revenue

Short fall

- Target of germplasm supply not achieved

Suggestion for further improvement

- Data from field performance of birds should be recorded and reported
- Efforts should be made to achieve the target supply

ICAR Research Complex for NEH Region, Nagaland Centre

Accomplishments and achievements

- Two batches of parents one each *Vanaraja* and *Srinidhi* were reared
- A total of 59910 improved chicken germplasm was distributed to the farmers
- An amount of Rs. 29.39 lakhs revenue was generated

Shortfall

- Field data not provided
- Target of germplasm supply not achieved

Suggestion for further improvement

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

ICAR Research Complex for NEH Region, Sikkim Centre

Accomplishments and achievements

- Two batches of *Vanaraja* parents were in position
- Distributed 70582 chicks to the farmers in the rural and tribal areas of Sikkim
- An amount of Rs. 43.84 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

ICAR Research Complex for NEH Region, Manipur Centre

Accomplishments and achievements

- Two batches of *Vanaraja,* and *Srinidhi* parents were reared
- The centre has supplied 17,645 chicks to farmers
- An amount of Rs. 13.32 lakhs of revenue was generated

Short fall

- Target of germplasm supply was not achieved

Suggestion for further improvement

- Efforts should be made to achieve the target supply

TANUVAS, Hosur

Accomplishments and achievements

- Two batches of parents were in position
- Distributed 98,649 chicks of *Vanaraja* and *Gramapriya* to the farmers in Tamil Nadu
- Generated an amount of Rs. 27.99 lakhs revenue

Short fall

- Target of germplasm not achieved

Suggestion for further improvement

- Data from field performance of birds should be recorded and reported
- Efforts should be made to achieve the target supply

ICAR-CCARI, Goa

Accomplishments and achievements

- Two batches of parents were reared
- Distributed 31,083 chicks to the farmers and generated Rs. 5.31 lakhs revenue

Short fall

- Target supply not achieved

Suggestion for further improvement

- Efforts should be made to meet the target supply
- Data from field performance of birds should be recorded and reported

ICAR-CIARI, Port Blair

Accomplishments and achievements

- Distributed 1200 improved germplasm to the farmers

Short fall

- Target supply not achieved
- No detailed information on egg production and hatchability provided

Suggestion for further improvement

- Efforts should be made to achieve the target supply

SKUAST, Srinagar

Accomplishments and achievements

- Two batches of parents were reared
- Distributed 18,113 chicks to the farmers.
- Generated Rs.6.97 lakhs revenue

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

- Efforts should be made to achieve target supply

ICAR-RC for NEH Region, Umiam, Meghalaya

Accomplishments and achievements

- One batch of parents were reared
- Distributed 10,211 improved germplasm to the farmers
- Generated Rs. 10.83 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

- Twelve batches of *Gramapriya, Vanashree*, *Kadaknath*, Ghagus were reared
- Distributed 62,972chicks to farmers
- Revenue was Rs. 16.9 lakhs

Short fall

- Nil

Suggestion for further improvement

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

SVVU, Tirupati

Accomplishments and achievements

- Two batches of *Vanaraja* were reared
- Distributed 22,169 chicks to farmers
- Revenue was Rs. 2.38 lakhs

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

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

Success Stories of AICRP on Poultry Breeding and Poultry Seed Project

Success story from Himachal Pradesh

Progressive agriculturalist of mid Himalayan ranges, successfully included backyard poultry farming and augmented the gains with utilization of his farm produce and other locally available resources (CSKHPKV, Palampur)

Challenge: With increasing momentum on backyard poultry in Himachal Pradesh through different developmental agencies the family production system especially in the village farming in hills is picking up. With advent of social media and other tech platform consumers are becoming aware about the inherent benefits of backyard/family type production system especially the component of near organic food is becoming popular in sub-urban areas of state. This indeed opens up opportunity for young farmers in the village who can upscale their production system to reap this potential benefit. There is need to develop young entrepreneurs who can take the challenge of up scaling of rural poultry with proper utilization of existing resources, improved management and most important addition of marketing aspects to maximise the gains. Sh. Sarwan Kumar s/o Sh. Dulo Ram is a progressive agriculturist belonging to village Averi of district Kangra of Himachal Pradesh

Initiative: During one of the visit programs of the Self-Help Group (SHG) of progressive farmers to the Poultry farm and hatchery complex he came into contact with the team of AICRP. During discussions in the interactive session, he has shown keen interest in the possibility of adding backyard type of poultry farming in his farming activities. He mentioned that many times when selling his other farm produce the customer also asks for free-range/backyard type desi eggs. He was advised to visit the centre again, with little background aspects of poultry management and his previous experience of keeping few desi birds he was ready to start the venture and explore the possibility of adding a dimension of the utilization of home-grown grains, and farm produce, and unconventional feed. Seeing his interest in rearing the backyard poultry by converging different farm resources AICRP team provided him with the on-farm training for one week and discussed/explored the possibility of upscaling the venture and market survey. He was advised to take a lot of around 300-400 DOC of *Himsamridhi.* He was supplied 300 chicks during April 2020, so as to have at least 100 layers during the season and able to sell around 100-120 cockerels during the period. The growths of the chicks supplied were periodically monitored and his concerns were also addressed and appropriate technical guidance/inputs were provided. The mortality in his flock was very less (less than 10%) during the chick and growing phases.

Key results/highlights/interesting facts: He successfully incorporated the compounded feed prepared by him utilizing home grown grains and purchases from the local village market. To enhance the value perception of his produce he utilized feed prepared on his own rather than utilizing the commercially available feed. This serves the dual purpose of economizing the cost of production to lower the breakeven point and also address the issue of non-availability of commercial feed in the nearby local market. He has utilized the method of preparing feed mix in a traditional flour mill referred to as "*Gharat*" in local parlance. He shifted the birds after the growing stage into his unutilized is the farm, as to provide scavenging area of around 10-15 square feet per bird during scavenging. During scavenging, he also started providing fodder like berseem from his farm and later also included watercress "*Chucch*" in the feeding regimen. The "*Chucch*" is akin to Azolla, however, it grows abundantly in local village pond/water bodies in the common property resources. Azolla cultivation requires seed/culture and space/efforts for growing while "*Chucch*" is available in abundance during the season. Since he has not fed the birds with commercial compounded feed, the birds started laying eggs in mid of November 2020 at around 7 months of age slightly delayed but within an acceptable range. He is retaining the laying hens to date with few culling. The male birds/cockerels which attained body weight of 1.5-2.0 kg at about 5-6 months of age were sold as per need/demand @ Rs.400-500/per bird giving him returns of Rs 60,000/- in a six-month duration from the sale of cockerels, resulting in income of around 30000 after accounting for various inputs including his own farm produce. According to Sh. Sarwan Kumar during the winter season earned handsome returns by selling cockerels at premium price since country chicken is in great demand during this period in the region. The egg production of female birds was around 50-60 eggs per day from around 100-120 layers during the peak production in the winter months during this period, he was able to sell eggs @ Rs. 12-15 Rs per egg, since the availability of poultry produce is limited in the winter season, thus premium price for selling is achievable. At present, he is getting about 50 eggs daily, giving him net return of Rs. 250-300 per day, and after the accounting, the input expenditure compounded feed net profit in month is around 7000-10000/month. He adopted

the mixed system of scavenging with grains for rearing poultry birds keeping the input cost at bare minimum. Slightly lower production compared to standard feeding practices completely offsets by the reduction in input cost/ efforts, since procurement of commercially available feed is both cost as well as time intensive as it has to be procured from distant market. Poultry litter was effectively utilized in his other agricultural/horticultural activities, from this year he was also advised to practice scientific preparation of poultry manure for maximum utilization. He also practices occasional supplementation with vitamins, minerals and calcium from time to time. A portion of eggs produced and cockerels were also consumed in the family to improve their nutritional quality.

Impact: Sh. Sarwan Kumar s/o Sh. Dulo Ram now making handsome profit in backyard poultry farming with improved LIT birds of Himsamridhi. Since he has developed good marketing skills while disposing of his other farm produce in the region, his acquaintances with potential customers who can pay premium prices helped him in maximizing his gains. Utilization of local home-grown grains, unconventional feed resources has also resulted in positive outcomes by reduction of input costs. This could be a model approach in the far-flung areas where availability of commercial feed and nutritional supplements is limited or is at exorbitant cost. He is also utilizing poultry manure in his vegetable farming and mushroom cultivation. Being a progressive farmer, having a good understanding of income from farm produce he realized that poultry farming is surely adding to his overall profit and he is continuing with this occupation adding replacement batches of 200-300 chicks at periodical intervals. On successful incorporation of locally available material into feeding regimen, the AICRP unit has also initiated work on developing the package of practices for effective utilization of locally available resources for economizing the small-scale family poultry farming.

Supporting Quotes and Images

Additional information

The work was carried under All India Research Project on Poultry Breeding (Rural Poultry Centre, Palampur) with financial support received from ICAR-Directorate of Poultry Research

Contact person

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Success stories from Assam

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

Name of the farmer/entrepreneur: Mr.Anjan Kumar Nath

Address with phone number and email: Village Nisinta, P.O and P.S. Agia, District Goalpara, Assam. Tel: 9854324519

Background of the farmer: Mr. Anjan Kumar Nath is a farmer. He wants to get himself engaged in poultry farming and also earned some extra fund apart from his other farm's income. He had a very good plot of land suitable for farming and also can sale the bird and eggs as a wholesaler or a retailer just from his doorstep

Initiative taken by the farmer: Mr. Anjan Kumar Nath who is farmer have interest in poultry farming. He came to College of Veterinary Science, Assam Agricultural University, Khanapara to know about *Kamrupa* bird after hearing from TV programme/friends. Due to quick return from poultry rearing majority of the people of Assam are engaged themselves in poultry rearing as more than 90 percent people of this region are non-vegetarian by food habit. But due to slow growth rate people showing less interest in case of indigenous bird rearing. Therefore, people prefer to rear "*Kamrupa*" bird-a dual purpose rural variety of chicken to have better body weight and egg production than indigenous bird for meat and egg production purpose.

Details of breed /Variety reared: The variety reared is "*Kamrupa*". *Kamrupa* is a dual type multi-colored rural variety of chicken being developed in All India Co-ordinated Research project on Poultry Breeding under Directorate of Research (vety), Assam Agricultural University, Khanapara, Guwahati. *Kamrupa* lays almost double the egg than Indigenous chicken and also have almost twice body weight in comparison to Indigenous chicken of Assam

Scientific intervention provided by the Institute/ Centrs/KVK/AH Department (training, inputs etc)

The farmer had been given detailed information about rearing of "*Kamrupa*" in respect of its management from chick to adult stage. The farmers had been taught about the nutritional and health coverage management of *Kamrupa*. He has been given a brochure where detail information about "*Kamrupa*" had been explained in detail in bi-lingual. He had been given free the Lasota and R2B vaccine either based on his requirement or whenever he asked for.

Achievements: Mr. Anjan Kumar Nath received on an average 300 nos. of *Kamrupa* DOC per batch, from where around 255-270 birds survived till 5 months. He sold the birds at 5 months @ Rs. 300/kg. At this age the weight of the birds was average 1.6 Kg. He got an average profit Rs. 66300.00/- by selling the birds per batch. (26x300=7800. feed 7x300=2100x25=52500, misc 3000=63300, sale 270x1.6x300=129600-63300=66300/5=13260) As per him *Kamrupa* birds can be successfully raised and can be a promising variety for meat production under rural situation. A paper on performance of "*Kamrupa*" is published and the reference is- *Kamrupa*-a new dual chicken variety for farmers of Asom and north-east-India, Indian journal of Animal Sciences, 86(6):686-690, June, 2016.

Socio economic impact: After getting the required information from AICRP on Poultry Breeding he procured on an average 300 birds from us per batch. He earned a handsome money of average Rs. 13260.00/month and it gives him inspiration towards poultry farming. It is learnt that knowledge, strong determination and hardworking is the key of success in any sector. Though some outbreaks of diseases are encountered but this can be overcome by strong biosecurity measures. Being a farmer, the profit earned through rearing of *Kamrupa* has given him a boost to run his family comfortably and hence it effects positively on socioeconomic aspect of the family.

Source (Institute/AICRP Center/PSP Centre/ KVK/AHD) and contributors

All India Co-ordinated Research project on Poultry Breeding, Directorate of Research (Vety), Assam Agricultural University, Guwahati Centre and the contributor is Dr Niranjan Kalita, Principle Investigator of the project.

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

Name of the farmer/entrepreneur: Mrs Nijara Rabha

Address with phone number and email: village Sairabaha, P.O. Sairabaha, P.S. Boko, District Kamrup, State Assam, Tel: 9957694718

Background of the farmer: Mrs Nijara Rabha of village Sairabaha, P.O sairabaha, P.S. Boko, District Kamrup, State Assam is a house wife and rear some indigenous bird to get some amount for her daily expenses. She is coming to college of veterinary Science in search of a job. As a poultry consultant I have advised her to start a poultry farm with *Kamrupa*. She picked up and started the farm with *Kamrupa*. She enhanced her knowledge and skill in poultry rearing and inclined to take poultry farming as livelihood security.

Initiative taken by the farmer: Among the different district of Assam, Kamrup district is one of the important districts in terms of poultry rearing as the demand of poultry meat is very high in this area. Though some of the people of this area follow scientific managemental practices but majority of the people rear indigenous bird in mostly traditional method. Therefore, the production of poultry egg and meat in this area is very low. To earn a better profit and have better livelihood through more profit Mrs Rabha procured "*Kamrupa*" chick and reared in scavenging condition. She got more profit in compare to indigenous flock and she inclined to rear *Kamrupa* in place of Indigenous chicken.

Details of breed /Variety reared: The variety reared is "*Kamrupa*". *Kamrupa* is a dual type multicolored rural variety of chicken being developed in All India Co-ordinated Research project on Poultry Breeding under Directorate of Research(vety), Assam Agricultural University, Khanapara, Guwahati. *Kamrupa* lays almost double the egg than Indigenous chicken and also have almost twice body weight in comparison to Indigenous chicken of Assam

Scientific intervention provided by the Institute/ Centrs/KVK/AH Department (training, inputs etc)

Mrs Nijara Rabha of village Sairabaha, P.O Sairabaha, P.S. Boko, District Kamrup, State Assam who was also a house wife and rear some indigenous bird but it is not at all economical as the productivity of indigenous is very low. She is coming to college of veterinary Science in search of a job. As a poultry consultant I have advised her to start a poultry farm with *Kamrupa* and also given a preliminary training about rearing of poultry in general and *Kamrupa* in particular with all details. She picked up and started the farm with *Kamrupa*. Gradually she enhanced her knowledge and skill in poultry rearing and inclined to take poultry farming as livelihood security.

Achievements: Mrs Rabha received on an average 100 nos. Chicks in every batch from which 85-90 nos. bird survived till their market age. He sold the bird at the age of 2 months where some of the bird he sold @ Rs. 270/bird and some of the bird sold @ Rs. 280/bird. The weights of the bird were in the range of 800-900 g. He got an average of profit Rs.6350/month and Rs.76200.00/year. (chick 2600, feed 3kgx100x25=7500, misc. 1000=11100, sale 85x280=23800-11100=12700/2=6350)

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

Socioeconomic impact: Mrs Rabha who originally reared indigenous chicken felt that it is not at all economical as the productivity of indigenous is very low. As per our advice the started poultry farm with *Kamrupa* bird. Gradually she enhanced her knowledge and skill in poultry rearing particularly *Kamrupa* and inclined to take poultry farming as livelihood security with *Kamrupa* bird. More than that she earned almost a handsome profit like a salary.

Source (Institute/AICRP Center /PSP Centre/ KVK/AHD) and contributors: All India Co-ordinated Research project on Poultry Breeding, Directorate of Research (Vety), Assam Agricultural University, Guwahati Centre and the contributor is Dr. Niranjan Kalita, Principle Investigator of the project.

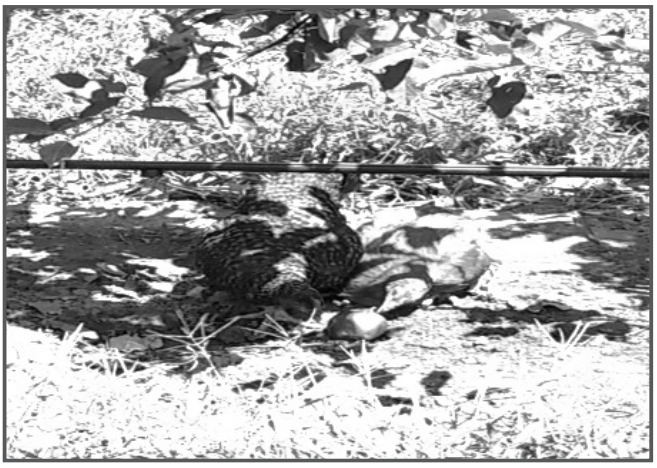
Success story from Jammu & Kashmir

Mr Danish Ahmad purchased day-old *Vanaraja* chicks through Poultry Seed Project-SKUAST-K to work out the feasibility and economic viability of integration of backyard poultry in apple orchards. The average cost of production for High-Density Apple orchard of 3 kannals is 1.75 Lakh. The net return in terms of apple is 7.0 lakh (700 boxes @ 1000Rs/box=7.0 lakh. The benefit cost ratio is 4:1**.** Adding *Vanaraja* birds into the apple orchards, the net returns from 150 birds had added Rs 1.43 lakh per 3 kannals of land excluding 10% of mortality of birds. The benefit-cost ratio had increased up to 4.4. The growth of plant trees was normal with zero percent mortality of trees and the yield percentage of the crop (apple) was increased by 10% by integration with *Vanaraja* birds. The plant health parameters like leaf health were found normal without scab. The fruit setting and fruit health was also without any abnormality or disease. However, in later stages, it was observed that lower fruits were eaten by birds, so we can recommend that clonal apple trees should be pruned and trimmed so that branching starts above three feet. The density of birds in apple orchards was also observed to be the main factor for controlling the birds in damaging the trees, which should always be below 50 birds per kannal.

Comparison of economy in terms of rupees of sole high-density orchard with integrated (*Vanaraja* birds) high-density orchards.

Sole High-density orchard of 3 kannals	**Integrated High-density orchard for 3 kannals.**
The average cost of production: **1.75 lakh** Average profit 700 boxes @ 1000 Rs/box=**7.0 lakh** **Benefit cost ratio: 4:1**	Expenditure of chicks (150 No.) @30/Chick = Rs **4500** Initial feed and medicine = Rs **12000** Total cost on poultry = Rs**16500** Total expenditure (1.75 lakhs For High density) and (0.165 lacs For poultry) = Rs **1.915 Lakh** Gross Return in terms of poultry (males after 6 months weighing 2Kg@ 400/ male= Rs28000/) + (sale of eggs@ Rs7/ egg, 150 No/ hen: Rs73500) and+ (sale of hens at the end of production weighing 3Kg:Rs42000) =Rs**143500** Total profit=7.0+1.43=8.430 lakh Total cost =1.75+0.165=1.915 lakh **Benefit cost ratio = 4.4:1**






***Vanaraja* under integrated farming in apple orchards**

Success stories from Bihar

Success story of Mr. Raju Kumar Singh

Mr. Raju Kumar Singh of village Lakhani, Block Chakia East Champaran, Bihar has started the *Vanaraja* Poultry Farming with 100 birds in May-2020 in support with PSP, Patna center. He was provided regular technical support about backyard poultry farming. He sold the birds with good profit and motivated to start the business at larger scale. Presently, he has a farm having 800 *Vanaraja* birds. He was getting Rs. 10,000/- per month by sale of egg and birds. He is satisfied with this venture and has planned to further extend the flock size in near future. This successful venture has created positive sentiments among others rural youths. Twelve more youth from same village have approached the PSP, Patna Centre for supply of chicks and other technical support related to backyard poultry farming. They all are willing to start the *Vanaraja* farming under Backyard system.

Raju Kumar Singh, of village Lakhani showing his backyard poultry farm

Success story of Mr. Durgesh Kumar

Mr. Durgesh Kumar of village Berzi, Muzaffarpur has started with 50 birds in the month of April- 2020 in Lockdown situation after closing his broiler farm. He sold the birds @250/- kg in three months. At present he is rearing 700 *Vanaraja* in his farm. He is getting about 4000-5000/- per month by selling of grower chicks to the local venders. About 15 persons of the area has started *Vanaraja* rearing after seeing the success.

Success story of Mr. Rudra Deo Mahto

Mr. Rudra Deo Mahto a Tharu tribe of village Govardhana, Ramnagar Block of West Champaran district started rearing of 50 *Vanaraja* birds in May-2020. Initially he received chicks of 3 weeks age through NASF Project of BASU Patna but after seeing the growth and demand of birds for meat purpose he invested Rs. 10,000 and bought 500 DOC from PSP Patna Centre. He was selling egg @ Rs.15/- per piece and chicken meat @ Rs. 400/- per Kg. He constructed a shed of 20x100 Sq. feet and started it on commercial scale. The other seven youth of the village has also started to rear birds. Now he is planning to purchase a small hatchery unit for chick production and supply to local people.

Success stories from Telangana

Success story of Mr. Venugopal Reddy

Mr. Venugopal Reddy is resident of Kampally village, Wardhanapet mandal, Hanamkonda district. Basically, he is an IT professional and rearing backyard poultry with the help of his family members. He purchased 500 straight run day old chicks (*Gramapriya*) from Poultry Seed Project, LRS, Mamnoor, Warangal. He reared the birds under intensive system (brooding) for one-month period; later the birds were reared under open range system in his farm house of 2 acres and were provided night shelter. The birds were fed on scavenging feed base and were provided supplementary feed in the form of broken rice, maize and vitamin - mineral supplements. The birds were dewormed and vaccinated regularly (IB Lasota Vaccine). He encountered an outbreak of Fowl pox in his farm in which there was a mortality of about 20-30 birds but recovered by following the advice given by the Scientists, PSP, Mamnoor. The males attained a body weight of 1.6 kg in 92-100 days and were sold at the rate of Rs. 350/- live kg body weight. He sold about 80 males and the rest of them were retained for household consumption and breeding purpose. The females were separated from males at 3 months of age and were given supplementary feeding at the rate of 25 gms/day and stone grit @5 g/bird/day. The first egg was recorded at the age of 6 months. Presently he is housing about 200 females with a hen day production of 55-60% that is 100 eggs /day and he is selling the eggs @ Rs.250/egg-tray. His monthly income is Rs. 20,000 by selling of adult birds and eggs.

Success story of Mr. D. Shetty Gopal

Mr. D. Shetty Gopal is resident of Kundan pally village, Tekummatta mandal, Jayashankar Bhopalpally district. He is an agriculturalist and has purchased 240 day old *Gramapriya* chicks during the month of January 2022. He has reared them intensively up to 1 month and fed layer chick feed @1kg per chick and followed complete vaccination schedule. He also followed water hygiene as per the guidelines and later after 2 month the birds were reared under free range system under scavenging feed base. Presently after 2½ months the birds attained an average body weight of 1.3 to 1.6 kg of which 40 birds with higher body weights were sold @ Rs. 350/kg body weight.

Economics

a)	Cost of chicks	:	240 DOC × Rs. 20 = 4,800/-
b)	Logistics (brooding and vaccination)	:	= 500/-
c)	Cost of feed	:	= 9,000/-
d)	Cost of Miscellaneous expenditure	:	= 2,000/-
	Total	**:**	**16,300/-**

Income earned

a) Sale of 40 birds @ 1.5 kgs × Rs. 350 /kg live weight = Rs. 22,400/-

The remaining birds are retained for egg production and left-over males for retailing. The farmer is expecting a good profit

Success story from Manipur

Mr. Jangkhosei Touthang (32 years) is a farmer from P.Phaimos village, Saikhul Subdivision, Kangpokpi district. He is a dedicated and sincere educated unemployed poultry farmer whose family depends on income generated from rearing poultry. He reared some 100 numbers of *Srinidhi* birds supplied from ICAR Poultry seed project, Manipur centre in the backyard as a source of income for household maintenance. Now he is happy with the income received from rearing poultry and he is ready to expand his poultry shed for rearing more number of birds.

Success story from Tamil Nadu

1	Name & Age	Mr. Jangkhosei Touthang (32 years)
2	Address	P.Phaimos village, Saikhul Subdivision, Kangpokpi district, Manipur
3	Input to the Farmers	100 numbers of *Srinidhi* chicks
4	Rearing system	Deep Litter System
5	Cost of Commercial feeds for 100 birds till 72 weeks	40 bags x Rs .2400=Rs. 96,000.00
6	Cost of Rice polish for 100 birds till 72 weeks	500kg X Rs 20/kg = Rs. 10,000.00
7	Medicines and Vitamin	Rs 5,000
7	Sale of excess male birds @280/kg	15 birds X 3.5 kg, 52.5kg x Rs. 280 = Rs14,700.00
8	Sale of litter@Rs.5/kg	180kg x Rs.5 =Rs.900
9	Sale of Eggs@Rs.12/egg	Rs.12 X 40 eggs =Rs. 480
10	Daily income from sale of eggs	Rs. 480
11	Income from eggs for 50 wks	350 days xRs 480= Rs 1,68,000.00
12	Net Profit Annual	Rs. 1,01,600.00
13	Average monthly income	Rs 6,050/-

Mr. N. Sriraman, aged 59, residing at Kaliyakudi village, Nannilam Taluk of Tiruvarur District in Tamil Nadu is a medium farmer and he rears Gramapriya for subsidiary income generation. He learned about production potential of Gramapriya and supply of the germplasm from College of Poultry Production and Management, Hosur under ICAR – Poultry Seed Project. He underwent formal training on "Desi chicken rearing" in Farmer Training Centre of Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) located at Tirurvarur, in which he learned about scientific management of desi chicken.

The farmer rears 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. 160 per kg live weight and keeps the layer chicken for egg production. The eggs are being sold at the rate of Rs. 15.00 per eggs. He regularly purchases about 100 number of Gramapriya chicks from PSP Centre, CPPM, Hosur through FTC, Tiruvarur, once in two months. The farmer has been rearing Gramapriya for egg production for four year.

Success story from Goa

Success story of Mr. Sandesh Mardolkar

Mr. Sandesh from Village- Charao Taluka-Tiswadi, North Goa, 35 years old and 10th passed, was already running a small-scale backyard poultry unit in charoa from last 1 year. He faced problems of cannibalism and lice infestation in poultry. His poultry coop was small without proper ventilation and lighting. He also reported problems of loss of feathering, stunting and flock mortality. He has no knowledge of reproducing his own flock by planned selection and mating.

He received fifty (50) Vanaraja chicks as part of the project 'Enhancing farm income through rural backyard poultry for scheduled tribe farmers of Coastal India". He was trained for formulating balanced poultry ration to improve the health status of birds. He also grows azolla, chakurmanis etc for inclusion in feed. Adoption of good managemental practices in housing, lighting reduced cannibalism and improved his flock health. He followed proper mating and produce his own replacement stock

which reduced the cost for purchase of new batch of chicks. He earns monthly 15000-20,000 from backyard poultry unit only. These interventions gave supplementary income to the farm family and improve the livelihood and nutritional security.

Success story of Mr. Utam S. Pavaskar

Mr. Pavaskar from Village: Pavshi Taluka: Kudal, Dist. Sindhudurg, 48 years old and 8th passed was maintaining few birds in his backyard. He was following only free-range system of rearing with little supplementation of feeds viz kitchen waste and broken rice. He was selling table eggs and the hatchability of these eggs was very low. He was unaware of artificial incubation and hatching of fertile eggs. He has limited knowledge of breeding, vaccination and deworming of poultry flock. Because of unscientific rearing practice and low-quality fertile egg and chick production, his annual income was very low around Rs. 70,000/-

Mr. Pavaskar attended a training on "Entrepreneurship development in poultry farming" during 3-5th June 2019 at ICAR-CCARI, Old Goa, Goa. He was provided with dual purpose Gramapriya chicken variety under Schedule Caste Sub Plan (SCSP) scheme. In addition, he was also provided with chick feeder, Jumbo feederer and parent feeder set, chick drinker with stand and adult drinker along with feed supplements for the birds. He was guided practically regarding scientific methods of periodic vaccination and timely deworming of the birds. He was trained the ways for proper collection, handling, storage and incubation of eggs in the incubator. He gained idea of artificial hatching and production of chicks from his own farm produced eggs. He was provided with resource material on "Incubation and hatching: problems and prevention". Now, he has a fully functional deep litter system with installed drinkers and feeders for the birds. He has purchased incubator cum hatcher and undertakes artificial incubation and hatching of eggs which allows him to sell 250-300 chicks per batch weekly. He also sells table eggs and live birds for meat purpose. He also uses poultry droppings and waste as manure for the plants in his farm after treatment period. Now, he is earning annual income of Rs. 3,10,000/- from this poultry farming.

Deep litter rearing system, semi-intensive free-range birds and incubator-cum-hatcher for hatching chicks

14 Publications

AICRP on Poultry Breeding

Research papers

Dahariya, N., Sathapathy, S., Mishra, U.K., Patra, R., Dehury, S., Joshi, S.K., Sahu, S.K., Samal, L. and Jena, B. 2021. Age related histomorphometrical studies on the major lymphoid organs of chicken. Indian Journal of Animal Research, 1-6. DOI: 10.18805/IJAR.B-4318.

Dinesh, K., Sankhyan, V., Thakur, D., Verma, N. and Bhardwaj, N. 2022. Effect of age on egg quality traits of Dahlem Red chicken under Intensive system of management in Himachal Pradesh. Indian Journal of Animal Sciences, 92(3):347-352.

Dinesh, K., Sankhyan, V., Thakur, Y.P., Thakur, D. and Kumar, R. 2021. Comparative performance evaluation of Dahlem Red, native and their crosses under intensive management in Himachal Pradesh. Indian Journal of Animal Sciences, 91(10):856-859.

Jareda, P., Mishra, S. and Rajkumar, U. 2021. Evaluation of Mewari, a native chicken breed visa vis Pratapdhan, an improved chicken variety under an intensive system of rearing. Indian Journal of Animal Sciences, 91(12):1061-1067.

Sahoo, N., Bhuyan, K., Panda, B., Behura, N.C., Biswal, S., Samal, L., Chaudhary, D., Bansal, N., Singh, R., Joshi, V.G., Jindal, N., Mahajan, N.K., Mann, S., Ravishankar, C., Ravindran, R., Radzio-Basu, J., Herzog, C.M., Kapur, V., Mor, S.K. and Goyal, S.M. 2022. Prevalence of Newcastle disease and associated risk factors in domestic chickens in the Indian state of Odisha. PLoS ONE 17(2): e0264028. https://doi.org/10.1371/journal.pone.0264028

Sharma, S., Singh, G., Vij, R., Sankhyan, V. and Dinesh, K. 2021. Physical and biochemical characterization of eggs of chicken crossbreed and its comparison with Dahlem Red for rural poultry development. Asian Journal of Dairy and Food Research, (40):466-470.

Book chapters

Behura, N.C. and Samal, L. 2021. Effect of climate change on sustainable backyard poultry production. In: Impact of Climate Change on livestock health and production (Eds.) Nayak, G.D., Sardar, K.K., Das, B.C. and Das, D.P., Nipa Publishing. Chapter 22. pp. 203-212.

Samal, L., Krishnan, G., Bagath, M., Sejian, V., Malik, P.K. and Bhatta, R. 2021. Climate Change adaptation in Animal Agriculture. In: Climate Resilient Animal Agriculture (Eds.) Rao, G.S.L.H.V.P., Varma, G.G. and Beena, V. Nipa Publishing. Chapter 01. pp. 1-20.

Lead paper

Anitha, P. and Suja, C.S. 2021. Conservation of poultry genetic sources- challenges and opportunities. Compendium of 13th Kerala Veterinary Science Congress held at College of Veterinary and Animal Sciences, Mannuthy, Kerala during November 13-14, 2021, pp 349-350.

Awards

- AICRP on poultry breeding Mannuthy centre received the 'Breed Conservation Award 2021' from ICAR- NBAGR, under the institution category for conserving Tellicherry native chicken breed.
- Dr. Suja C.S (Farm Manager) received the 'Best paper with first prize' in Session 5- Livestock and poultry production (poster presentation category) for the paper titled 'Production performance of long term selected pure White Leghorn strains' authored by Beena C. Joseph, Suja C.S., P. Anitha, Harikrishnan S. and Devavratha S. in the 13th Kerala Veterinary Science Congress held during November 13-14, 2021 at College of Veterinary and Animal Sciences, Mannuthy, Kerala.
- Dr. Suja C.S (Farm Manager) received the "Best paper with third prize" in Session 5- Livestock and poultry production (oral presentation category) for the paper Comparative evaluation of production performance of six generations of Tellicherry chicken breed of Kerala (Suja C.S, Beena C Joseph, P Anitha, Harikrishnan S and Devavratha S.) in the 13th Kerala Veterinary Science Congress held during November 13-14, 2021 at College of Veterinary and Animal Sciences, Mannuthy, Kerala.

15 Addresses

AICRP-PB Centres

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Distribution of BND chicks to farmers by Hon'ble Minister of state for Agriculture and Farmers welfare Ms. Shobha Karandlaje, (Agartala centre)

Visit of exhibition by Hon'ble Minister of State for Fisheries, Animal Husbandry and Dairying Dr. Sanjeev Kumar Balyan, (Agartala centre)

Hon'ble Revenue cum Housing Minister, Adv. K. Rajan distributing the wooden coop and Tellicherry birds to the beneficiary (Mannuthy centre)

Coloured broiler parent line birds (Bengaluru centre)

A pair of BND birds (Agartala centre)

A pair of Jabalpur Colour birds

A pair of Ankleshwar birds (Anand centre)

A flock of Himsamridhi birds in the field (Palampur centre)

On farm training of SHG at Palampur centre of AICRP on Poultry Breeding

Distribution of chicks and feed to the women farmers of Bijadandi village (Jabalpur centre)

Skill development training and demonstration at Goa centre

Woman farmer receiving inputs for poultry rearing at Srinagar centre

Improved chicken varieties at farmers field in Warangal

An ST farmer with Vanaraja birds provided by Sikkim centre

Vanaraja birds at Sikkim farmer's backyard

Training on rearing of Vanaraja birds at Tirupati centre

A woman beneficiary of Warangal centre feeding birds in backyard

Improved bird varieties in backyard at Goa

Distribution of Vanaraja birds by Elected Representatives and University Officials (Tirupati centre)

Distribution of inputs to tribal farmers at Srinagar centre

Notes

Brochures

ICAR-DPR You Tube Channel

Contact us

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