वार्षिक प्रतिवेदन
Annual Report
2020- 21

AICRP on Poultry Breeding and Poultry Seed Project

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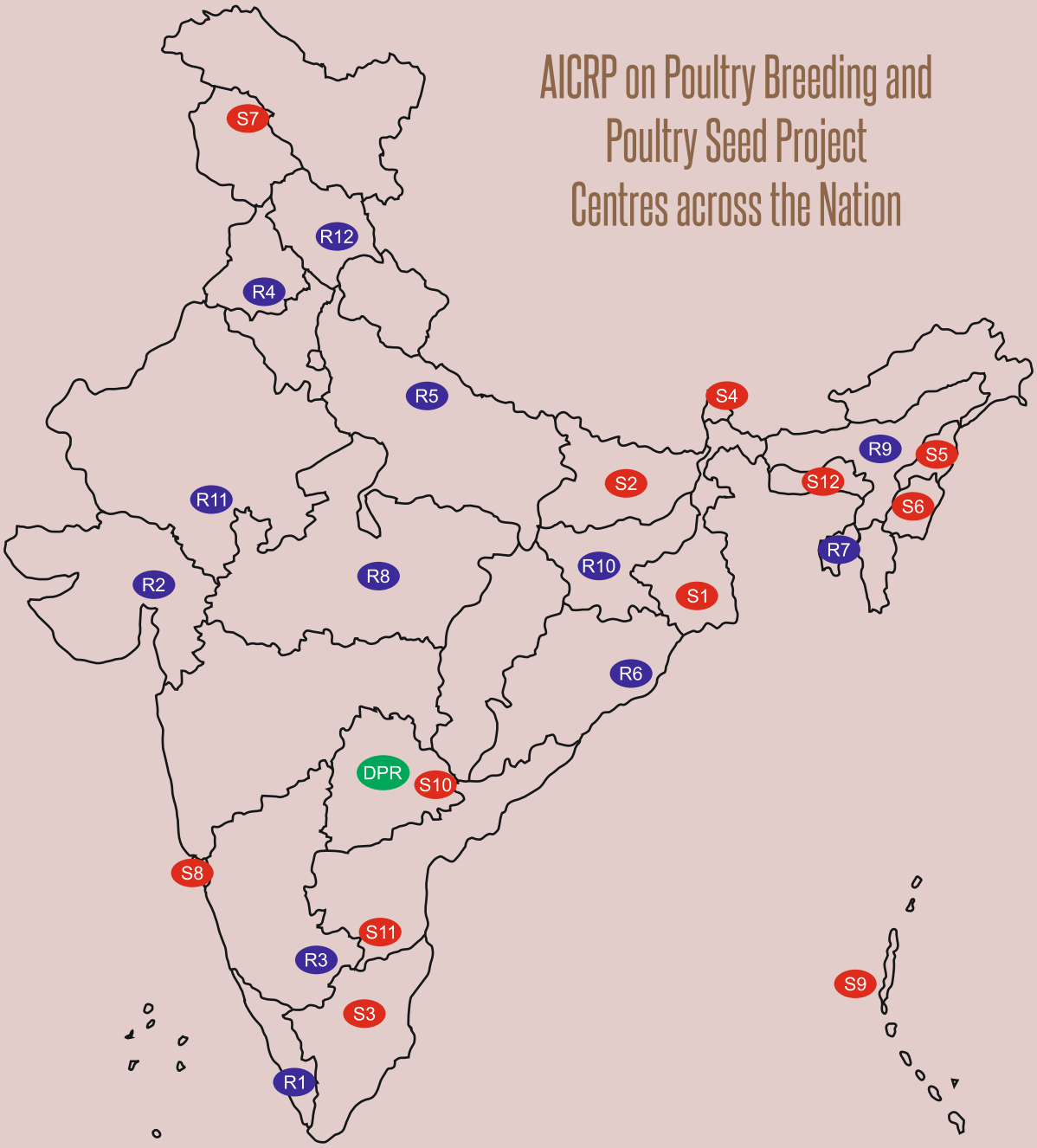
AICRP on Poultry Breeding and Poultry Seed Project Centres across the Nation



ICAR - DPR

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

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

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www.pdonpoultry.org

https://aicrp.icar.gov.in/poultry

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Dr. R.N. Chatterjee
Director

Compilation and Editing

AICRP on Poultry Breeding	**Poultry Seed Project**
Dr. L. Leslie Leo Prince	Dr. M. Shanmugam
Dr. Santosh Haunshi	Dr. Vijayakumar
Dr. U. Rajkumar	Dr. M. Niranjan
	Dr. S. V. Rama Rao

Hindi Translation : Mr. J. Srinivasa Rao

Inside Front Cover
Location of AICRP on Poultry Breeding
and Poultry Seed Project centres

Inside Back Cover
ICAR-DPR Building

Back Cover
Azadi Ka Amrit Mahotsav Logo

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Tel : 040 4858 8228, 9700800228
e-mail : vangoghstudio@gmail.com
web : www.vangoghstudio.in

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 twelve centres of Poultry Seed Project. It is my pleasure to present the Annual Report of AICRP on Poultry Breeding and Poultry Seed Project for the year 2020-21.

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. Twelve Poultry Seed Project centres spread across the country are in operation to increase the availability of improved germplasm throughout the country. 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 thirteen success stories have been documented during the year 2020-21 from different centres. During the year a total of 9.80 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. 325.9 lakhs revenue was generated by supplying the improved chicken germplasm.

I am extremely grateful to Dr. Trilochan Mohapatra, Secretary, DARE and Director General, ICAR for all the support and encouragement extended for 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), Dr. Vineet Bhasin, Principal Scientist (AG&B) and other scientific and administrative staff of the ICAR (HQ) for extending help from time to time. The research progress achieved could not have been possible without the support and contribution of the scientists of AICRP and PSP cell at the Institute and all the PIs of AICRP and PSP, who deserves due appreciation. I also thank all other staff for supporting the scientists in their research endeavour. I also thank the editorial committee for bringing out this report in an appreciable manner.

Date : 21-02-2022

(R.N. Chatterjee)

Director

Abbreviations

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

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कुक्कुट प्रजनन पर अखिल भारतीय समन्वित अनुसंधान परियोजना (एआईसीआरपी)

कुक्कुट प्रजनन पर स्थित एआईसीआरपी परियोजनाओं को बारह केंद्रों पर सफलतापूर्वक संचालित किया जा रहा है,वह इस प्रकार से हैं - केवीएएफएसयू, मन्नुति; एएयू, आनंद; केवीएएफएसयू, बेंगलुरु; जीएडीवीएएसयू, लुधियाना; ओयूएटी, भुवनेश्वर; भाकृअनुप-केंपअनुसं, इज्जतनगर; एनईएच क्षेत्र, अगरतला के लिए भाकृअनुप क्षेत्रीय केंद्र; एनडीवीएसयू, जबलपुर; एएयू, गुवाहाटी; बीएयू, रांची; एमपीयूएटी, उदयपुर; और सीएसकेएचपीकेवीवी, पालमपुर है। परियोजना का मुख्य उद्देश्य स्थान विशिष्ट कुक्कुट किस्मों का विकास करना, देशी, विशिष्ट लेयर और ब्रायलर जर्मप्लाज्म का संरक्षण, सुधार, लक्षण वर्णन और अनुप्रयोग; ग्रामीण, आदिवासी और घर आंगन क्षेत्रों में ग्रामीण कुक्कुट पालन और उद्यमिता प्रथाओं के पैकेज का विकास करना है। इसके अतिरिक्त केवीएएसयू, मन्नुति, और एएयू, आनंद केंद्र में दो विशिष्ट लेयर जर्मप्लाज्म (आईडब्ल्यूएन और आईडब्ल्यूपी) बनाए रखे गए। केवीएएफएसयू, बेंगलुरु और जीएडीवीएएसयू, लुधियाना, ओयूएटी, भुवनेश्वर, भाकृअनुप-केंपअनुसं, इज्जतनगर में कुल चार (प्रत्येक केंद्र द्वारा दो) विशिष्ट ब्रॉयलर जर्मप्लाज्म (पीबी - 1 , पीबी - 2 , सीएसएमएल और सीएसएफएल) बनाए रखे गए हैं।

यादृच्छिक नियंत्रित कुक्कुट वंशावली नस्लों (एक लेयर के लिए और दूसरी ब्रॉयलर के लिए) को भाकृअनुप–डीपीआर, हैदराबाद में बनाए रखा गया। इन कुक्कुटों के अंडे सेने के नमूने आनुवंशिक प्रगति को मापने के लिए कुक्कुट प्रजनन पर एआईसीआरपी के विभिन्न केंद्रों में भेजे जा रहे हैं। परिषद द्वारा लिए गए निर्णय के अनुसार विभिन्न एआईसीआरपी केंद्रों और भाकृअनुप-डीपीआर पर अनुरक्षित नस्लों को विभिन्न एआईसीआरपी केंद्रों में प्रतिरूप किया गया तथा तीन एवं चार मार्गीय संकरों के उत्पादन के लिए केंद्र द्वारा संसाधन कुक्कुट संख्या के रूप में उपयोग किया गया । विभिन्न एआईसीआरपी केंद्रों में प्रतिरूप किए जा रहे नस्लों में आनंद में IWD और IWK और जबलपुर में M - 1 और M - 2 हैं। वर्ष के दौरान विभिन्न केंद्रों से कुल 6,38,088 कुक्कुट जर्मप्लाज्म किसानों को वितरित किया गया। उन्नत कुक्कुट जर्मप्लाज्म के वितरण और प्रसार के माध्यम से रु. 176.13 लाख राजस्व राशि सृजित की गयी।

मन्नुति केंद्र ने 2020-21 के दौरान 40 सप्ताह की आयु तक देशी कुक्कुट जर्मप्लाज्म की एस-5 पीढ़ी और ८ सप्ताह की आयु तक एस-6 पीढ़ी का मूल्यांकन किया। 40 सप्ताह की आयु तक S-5 में देशी कुक्कुट जर्मप्लाज्म का अंडा उत्पादन 78.95 अंडे रहा, जिसका औसत वजन 44.08 ग्राम रहा। अंडे का उत्पादन वही रहा जबकि पिछली पीढ़ी की तुलना में एस-5 पीढ़ी में 40 सप्ताह अंडे का वजन 1.04 ग्राम बढ़ा। S-5 पीढ़ी में अच्छी उर्वरता (91.50%) और हैचबिलिटी (FES और TES पर 89.6 और 80.13%) देखी गई। इसके अतिरिक्त केंद्र ने लेयर नियंत्रण जीव संख्या के साथ-साथ S-32 पीढ़ी में 64 सप्ताह की आयु तक IWN और IWP उपभेदों का मूल्यांकन किया। इस पीढ़ी में पिछली पीढ़ी की तुलना में फेनोटाइपिक आधार पर आईडब्ल्यूएन और आईडब्ल्यूपी दोनों में क्रमशः 0.2 अंडे (267.9) और 4.6 अंडे (256.8) एवं 64 सप्ताह की आयु तक अंडे का उत्पादन बढ़ है। केंद्र ने 18.78 लाख रुपये का राजस्व अर्जित किया है और वर्ष के दौरान कुल 1,22,876 जर्मप्लाज्म की आपूर्ति की है। चालू वर्ष के दौरान केन्द्र से जर्मप्लाज्म आपूर्ति से लाभान्वित होने वाले किसानों की संख्या 303 रही।

आनंद केंद्र ने 40 सप्ताह की आयु तक अंकलेश्वर नस्ल की एस - 1 पीढ़ी का मूल्यांकन किया। 4 0 सप्ताह की आयु तक अंकलेश्वर कुक्कुट (एस-1 जीन) का अंडा उत्पादन 76.38 रहा, जो एस-0 पीढ़ी (71.06) की तुलना में अधिक रहा। अंकलेश्वर कुक्कुट की एस-2 पीढ़ी का उत्पादन किया गया और इसका मूल्यांकन किया जा रहा है। IWN और IWP उपभेदों की S-1 पीढ़ी का 72 सप्ताह की आयु तक मूल्यांकन किया गया। आईडब्ल्यूएन नस्ल (307.24) की तुलना में आईडब्ल्यूपी (309.79) में 72 सप्ताह की आयु तक अंडे का उत्पादन अधिक रहा। IWN और IWP उपभेदों की S-2 पीढ़ी का उत्पादन किया गया और इसका मूल्यांकन किया जा रहा है। IWD और IWK उपभेदों की S-8 पीढ़ी का मूल्यांकन 64 सप्ताह की आयु तक किया गया। 6 4 सप्ताह की आयु तक अंडे का उत्पादन आईडब्ल्यूके (226.47) में आईडब्ल्यूके नस्ल (218.14) की

तुलना में अधिक रहा। वर्ष के दौरान केंद्र ने रुपये 24.91 लाख राजस्व उत्पन्न किया। समीक्षाधीन अवधि के दौरान केंद्र ने कुल 55,528 जर्मप्लाज्म की आपूर्ति की है।

बेंगलुरु केंद्र ने वर्ष के दौरान देशी कुक्कुट पीबी-1 और पीबी-2 वंशावलियों और उनके संकरों का मूल्यांकन किया। पीबी - 1 और पीबी - 2 वंशावलियों में पांच सप्ताह के शरीर का वजन क्रमशः 1126 ± 4.74 और 1097 ± 6.03 ग्राम रहा। पीबी - 1 और पीबी - 2 वंशावलियों में 40 सप्ताह की आयु तक अंडे का उत्पादन क्रमशः 54.5 और 43 अंडे रहा। 8, 20 और 40 सप्ताह की आयु में देशी कुक्कुट का वजन क्रमशः 384.9, 1208 और 1417 ग्राम रहा। पीबी-1 में 5 सप्ताह के शरीर के वजन की फेनोटाइपिक और आनुवंशिक प्रतिक्रिया क्रमशः 16.41 और 30.68 ग्राम रही और पीबी-2 में संबंधित मान क्रमशः 9.52 और 19.45 ग्राम रही। किसानों को कुल 1,71,482 कुक्कुट जर्मप्लाज्म वितरित किया गया। वर्ष के दौरान केंद्र ने रु. 49.69 लाख राजस्व सृजित किया।

लुधियाना केंद्र ने इस वर्ष के दौरान पंजाब ब्राउन, पीबी-1 और पीबी-2 वंशावलियों का मूल्यांकन किया। पीबी-1 और पीबी-2 वंशावलियों में पांच सप्ताह के शरीर का वजन संगत एफसीआर 1202 और 1000 के साथ क्रमशः 1.87 और 1.89 के ग्राम रहा। 40 सप्ताह की आयु तक अंडे का उत्पादन क्रमशः पीबी-1 और पीबी-2 वंशावलियों में 53.27 और 55.27 रहा। पंजाब ब्राउन में 3.9 एफसीआर के साथ 8 सप्ताह के शरीर का वजन 721.6 ग्राम रहा। पंजाब ब्राउन में 52 सप्ताह की आयु तक अंडे का उत्पादन 99.26 अंडे रहा । केंद्र ने किसानों को 84,279 जर्मप्लाज्म वितरित कर रु. 24.42 लाख राजस्व अर्जित किया।

भाकृअनुप-केंपअनुसं, इज्जतनगर केंद्र ने 2020-21 के दौरान स्थानीय देशी कुक्कुट, सीएसएमएल और सीएसएफएल का मूल्यांकन किया। सीएसएमएल x देसी संकरों में 12 सप्ताह की आयु में शरीर का वजन 1449 ग्राम रहा। सीएसएमएल और सीएसएफएल में 5 सप्ताह में शरीर का वजन क्रमशः 1198 और 1012 ग्राम रहा। उत्तरप्रदेश के 36 किसानों को कुल 23,398 उन्नत कुक्कुट जर्मप्लाज्म वितरित किए गए।

भुवनेश्वर केंद्र को हंसली, सीएसएसएल, सीएफएसएल और उनके संकरों का मूल्यांकन का काम सौंपा गया। खेत में झुंड को फिर से स्थापित करने के लिए हंसली कुक्कुटों को देशी पथ से खरीदा गया।

त्रिपुरा केंद्र ने वर्ष के दौरान त्रिपुरा ब्लैक, दलहमरेड, ब्रॉयलर मादा वंशावली और उनके संकरों का मूल्यांकन किया। बीएनडी संकरों (ई4) में खेत एवं क्षेत्रों की स्थितियों के तहत 40 सप्ताह तक अंडे का उत्पादन क्रमशः 53.77 और 42.95 अंडे रहा। 8, 20 और 40 सप्ताह की आयु में खेतों में शरीर का वजन क्रमशः 515.81, 1605.12 और 1964.26 ग्राम और किसानों के क्षेत्रों में 435.25, 1531.63 और 1772.40 ग्राम रहा। इस अवधि के दौरान त्रिपुरा के 516 किसानों को कुल 31959 चूजों की आपूर्ति की गई, जिससे रु. 20.86 लाख राजस्व प्राप्त हुआ।

जबलपुर केंद्र ने कड़कनाथ, जबलपुर रंगीन और नर्मदानिधि कुक्कुटों का मूल्यांकन किया। 40 सप्ताह में जबलपुर और कड़कनाथ में शरीर का वजन क्रमशः 1970 और 1545 ग्राम रहा। एएसएम क्रमशः 155 और 168 दिन रहा। 52 सप्ताह की आयु तक अंडे का उत्पादन जबलपुर रंगीन में 160 अंडे और कड़कनाथ में 93 अंडे रहा। खेत परिस्थितियों में नर्मदानिधि का 20 सप्ताह का वजन नर में 1370 ग्राम और मादा में 1120 ग्राम रहा। 86 किसानों को कुल 2,961 कुक्कुट जर्मप्लाज्म वितरित किए गए जिससे रु 6.34 लाख राजस्व की प्राप्ति हुई।

गुवाहाटी केंद्र ने 40 सप्ताह की आयु तक दाओथिगीर के साथ-साथ 52 सप्ताह तक देशज, दलहमरेड, पीबी-2 और बीएन कुक्कुट संख्या का मूल्यांकन किया। पांच सप्ताह में शरीर का वजन देशज में 150.30 ग्राम, पीबी-2 में 1180.60 ग्राम और दलहमरेड में 410.30 ग्राम रहा। देशी कुक्कुटों में अंडे का वजन और अंडे का उत्पादन 52 सप्ताह तक क्रमशः 40.80 ग्राम और 68.60 अंडे रहा। कामरूपा में 40 और 52 सप्ताह की आयु तक अंडे का उत्पादन 49.90 और खेत में 91.30 अंडे रहा और खेत में संबंधित मूल्य क्रमशः 44.30 और 74.80 अंडे रहा। दाओथिगीर के लिए यौन परिपक्वता की आयु 208.30 दिन रही । कुक्कुटों का 40 सप्ताह की आयु तक अंडे का उत्पादन 18.10 अंडे रहा । केंद्र ने 266 किसानों को 40095 जर्मप्लाज्म की आपूर्ति की जिससे वर्ष के दौरान रु.5.12 लाख राजस्व प्राप्त हुआ।

रांची केंद्र ने देशी कुक्कुट, दहलेमरेड, पीबी-2 व झारसिम का मूल्यांकन किया। 72 सप्ताह की आयु में देशी कुक्कुट संख्या का अंडा उत्पादन 119 (G8) रहा। जी9 पीढ़ी के दौरान देशी कुक्कुट में एक दिन की आयु और 4 सप्ताह की आयु में शरीर का वजन 28.08 ± 0.12 और 166.33 ± 0.87 ग्राम रहा । पिछले मूल्यांकन की तुलना में देशी कुक्कुट के शरीर के वजन और अंडे के उत्पादन में सुधार देखा गया । केंद्र ने 163 किसानों, गैर सरकारी संगठनों, केवीके और अन्य एजेंसियों के बीच 18472 झारसीम चूजों की आपूर्ति कर रु. 6.13 लाख राजस्व प्राप्त किया।

पालमपुर केंद्र ने वर्ष के दौरान देशी जर्मप्लाज्म, दलहमरेड और हिमसमृद्धि का मूल्यांकन किया। 40 सप्ताह और 52 सप्ताह में देशी कुक्कुटों में एचडीईपी क्रमशः 45.95 और 80.16 अंडे रहा। दहलेमरेड में 40 सप्ताह का एचडीईपी 63.97 अंडे रहा। हिमसमृद्धि में एचडीईपी ४० सप्ताह और ५२ सप्ताह में क्रमशः 53.61 और 92.35 अंडे रहा। हिमाचल पर्वतीय क्षेत्र के 466

किसानों को कुल 53679 जर्मप्लाज्म वितरित किया गया। इस दौरान रु. 15.71 लाख राजस्व के रूप में उत्पन्न किया गया।

उदयपुर केंद्र ने वर्ष के दौरान मेवाड़ी, सीएसएफएल, आरआईआर और प्रतापधन कुक्कुटों का मूल्यांकन किया। मेवाड़ी कुक्कुटों में 40 सप्ताह की आयु का वजन 1732 ग्राम रहा। 52 सप्ताह की आयु तक अंडे का उत्पादन मेवाड़ी कुक्कुट में 50.60 अंडे रहा। प्रतापधन में वार्षिक अंडा उत्पादन (72 सप्ताह की आयु तक) 158.20 रहा। केंद्र ने खेत और क्षेत्र की स्थितियों के तहत मांस प्रकार के कुक्कुट जर्मप्लाज्म का मूल्यांकन किया। परियोजना के टीएसपी घटक के तहत 405 आदिवासी किसानों को लाभान्वित करते हुए सात प्रशिक्षण कार्यक्रम आयोजित किए गए। चालू वर्ष के दौरान 557 किसानों को कुल 31,179 उन्नत कुक्कुट जर्मप्लाज्म वितरित किए गए। केंद्र को जर्मप्लाज्म के वितरण से रू.7.12 लाख राजस्व प्राप्त हुआ।

वर्ष 2020-21 के दौरान एआईसीआरपी केंद्रों द्वारा केंद्रवार जर्मप्लाज्म वितरण एवं राजस्व सृजन

केंद्र	जर्मप्लाज्म (संख्या)	राजस्व (रूपए लाखों में)
केवीएएसयू , मन्नुति	122876	18.78
एएयू, आनंदी	55528	24.91
केवीएएफएसयू, बेंगलुरु	171482	49.69
जीएडीवीएएसयू, लुधियाना	84279	24.42
ओयूएटी, भुवनेश्वर	100	0.08
भाकृअनुप-केंपअनुसं, इज्जतनगर	25038	0
एनडीवीएसयू, जबलपुर	2961	6.34
एमपीयूएटी, उदयपुर	31179	7.12
एएयू, गुवाहाटी	40095	5.12
सीएसकेएचपीकेवीवी, पालमपुर	54119	12.68
बीएयू, रांची	18472	6.13
भाकृअनुप - क्षेत्रीय केंद्र , अगरतला	31959	20.86
कुल	**6,38,088**	**176.13**

कुक्कुट बीज परियोजना (पीएसपी)

कुक्कुट बीज परियोजना हमारे देश के दूरदराज क्षेत्रों में ग्रामीण कुक्कुट जर्मप्लाज्म की उपलब्धता को बढ़ाने के उद्देश्य से विकसित की गई। इस दिशा 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 है। अपने-अपने क्षेत्रों में किसानों की आवश्यकताओं को पूरा करने के लिए पांच और केंद्रों को जोड़कर बारहवीं योजना के दौरान परियोजना को सुदृढ़ किया। वर्तमान में यह परियोजना देश भर में १२ केंद्रों पर संचालित की जा रही है। इस परियोजना का मुख्य उद्देश्य उन्नत कुक्कुट जर्मप्लाज्म (उपजाऊ अंडे, एक दिन आयु के चूजे और वयस्क चूजे) का स्थानीय उत्पादन और ग्रामीण कुक्कुट उत्पादन को बढ़ाने के लिए अंडे और मांस के उत्पादन में वृद्धि को लक्षित करने के लिए दूरदराज के क्षेत्रों में विभिन्न हितधारकों को आपूर्ति करना है। सामाजिक-लक्षित समूहों की आर्थिक स्थिति और छोटे पैमाने के कुक्कुट उत्पादकों को संगठित बाजार से जोड़ना है।

बिहार पशु विज्ञान विश्वविद्यालय, पटना में पीएसपी केंद्र 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।

यह निदेशालय एक समन्वय इकाई के रूप में पेरेंट चूजों की आपूर्ति करते हुए विभिन्न केंद्रों की गतिविधियों का समन्वय और निगरानी करता है ताकि प्रत्येक केंद्र के लिए निर्धारित लक्ष्यों को प्राप्त करने में सक्षम बनाया जा सके। वर्ष 2020-21 के दौरान मुख्य भूमि और उत्तर-पूर्व क्षेत्रों के विभिन्न केंद्रों के लिए चूजों की आपूर्ति के निर्धारित लक्ष्य प्रति वर्ष 0.5 और 1.0 लाख चूजे रहा और घर आंगन कृषि स्थितियों के तहत जर्मप्लाज्म के प्रदर्शन पर प्रतिक्रिया एकत्र करना है। कुल 3,42,897 उन्नत कुक्कुट किस्मों को उनके संबंधित क्षेत्रों/राज्यों में वितरित किया गया, जिससे वर्ष के दौरान रु.149.83 लाख राजस्व प्राप्त हुआ।

पटना केंद्र में वनराजा एवं ग्रामप्रिया पेरेंटों के दो बैचों को पाला गया। वर्ष 2020-21 के दौरान बिहार में किसानों को कुल 50,495 वाणिज्यिक कुक्कुट जर्मप्लाज्म वितरित किया गया, जिससे रु.22.25 लाख राजस्व प्राप्त हुआ।

झरनापानी केंद्र में वनराजा एवं श्रीनिधि के एक-एक जत्थे को बनाया रखा गया। वर्ष 2020-21 के दौरान नागालैंड और पड़ोसी राज्यों के किसानों को कुल 51,024 उन्नत कुक्कुट जर्मप्लाज्म वितरित किए गए। पीएसपी के तहत झरनापानी केंद्र में कुल रु. 30.45 लाख राजस्व का सृजन किया गया।

वनराजा पेरेंटों के दो बैचों को भाकृअनुप, एनओएफआरआई, गंगटोक, सिक्किम में पाला गया। वनराजा के कुल 69,241 उन्नत कुक्कुट जर्मप्लाज्म को सिक्किम राज्य के 231 गांवों में 1992 किसानों को वितरित कर रू. 33.95 लाख राजस्व प्राप्त किया। इस केंद्र ने जर्मप्लाज्म के निर्धारित लक्ष्य को प्राप्त किया।

इस वर्ष के दौरान वनराजा के तीन जत्थे और श्रीनिधि पेरेंटों के दो जत्थे मणिपुर केंद्र में पाले गए। मणिपुर में किसानों को कुल 15,080 उन्नत कुक्कुट जर्मप्लाज्म वितरित किया गया। केंद्र ने वर्ष 2020-21 के दौरान रु.1.44 लाख राजस्व प्राप्त किया।

इस अवधि के दौरान होसुर केंद्र में वनराजा और ग्रामप्रिया पेरेंटों के दो बैचों को पाला गया। तमिलनाडु में 787 लाभार्थियों को कुल 74,851 उन्नत ग्रामीण कुक्कुट (वनराजा और ग्रामप्रिया) जर्मप्लाज्म वितरित किया गया। केंद्र ने वर्ष के दौरान रु. 23.42 लाख राजस्व अर्जित किया।

इस वर्ष के दौरान गोवा में वनराजा एवं कृषिब्रो पेरेंटों के एक-एक बैच को पाला गया। गोवा, कर्नाटक और महाराष्ट्र के 951 किसानों को कुल 35,822 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु. 8.32 लाख राजस्व प्राप्त किया गया।

पोर्टब्लेयर में डीपलिटर पद्धति के तहत वनराजा पेरेंटों के एक बैच को पाला गया। अंडमान और निकोबार द्वीप समूह के किसानों को कुल 4503 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर वर्ष के दौरान रु. 96625 राजस्व प्राप्त किया।

एनईएच क्षेत्र, उमियाम, बारापानी के भाकृअनुप क्षेत्रीय केंद्र में वनराजा पेरेंटों के दो बैचों को पाला गया। मेघालय में किसानों को कुल 15,177 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु. 9.95 लाख राजस्व किया।

श्रीनगर केंद्र में वनराजा पेरेंटों के दो जत्थे पाले गए। जम्मू-कश्मीर के किसानों को कुल 17,260 उन्नत कुक्कुट जर्मप्लाज्म वितरित कर रु.7.07 लाख राजस्व प्राप्त किया गया।

एसवीवीयू, तिरुपति, आंध्रप्रदेश में वनराजा पेरंटों के दो बैच बनाए गए। किसानों को कुल 29,157 चूजों की आपूर्ति की गई और इस अवधि के दौरान चूजों और अंडों की बिक्री से रू.3.87 लाख की आय प्राप्त हुई।

इस अवधि के दौरान पीवीएनआरटीवीयू, वारंगल, तेलंगाना में वनराजा, ग्रामप्रिया और वनश्री पेरेंटों के पांच बैचों का पालन-पोषण किया गया। कुल 33,411 उन्नत ग्रामीण कुक्कुट जर्मप्लाज्म किसानों को वितरित किए गए। केंद्र ने कुल रु. 8.15 लाख राजस्व अर्जित किया।

कुक्कुट बीज परियोजना के तहत वर्ष 2020-21 के दौरान केंद्रवार जर्मप्लाज्म का वितरण एवं राजस्व सृजन

केंद्र	जर्मप्लाज्म (संख्या)	राजस्व (रूपए लाखों में)
बीएएसयू , पटना	50,495	22.25
डब्ल्यूबीयूएएफएस, कोलकाता	-	-
भाकृअनुप-क्षेत्रीय केंद्र , झरनापानी	51,024	30.45
भाकृअनुप-नोफरी, गंगटोक	69,241	33.95
भाकृअनुप-क्षेत्रीय केंद्र , इंफाल	15,080	1.44
तनुवास, होसुर	74,851	23.42
भाकृअनुप-सीसीएआरआई, गोवा	35,822	8.32
भाकृअनुप - सीआईएआरआई, पोर्ट ब्लेयर	4,503	0.96
एसकेयूएएसटी, श्रीनगर	14,631	7.07
एनईएचआर, उमियाम के लिए भाकृअनुप-क्षेत्रीय केंद्र	15,177	9.95
पीवीएनआरटीवीयू, वारंगल	33,411	8.15
एसवीवीयू, तिरुपति	29,157	3.87
कुल	**342,897**	**149.83**

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, elite layer and broiler germplasm; development of package of practices for village poultry and entrepreneurships in rural, tribal and backyard areas. In addition, KVASU, Mannuthy, 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 6,38,088 chicken germplasm was distributed to the farmers from different centres. An amount of Rs. 176.13 lakhs revenue was generated through distribution and propagation of the improved chicken germplasm.

Mannuthy centre during 2020-21 has evaluated the S-5 generation of native chicken germplasm up to 40 weeks of age and S-6 generation up to 8 weeks of age. Egg production of native chicken germplasm up to 40 weeks of age in S-5 was 78.95 eggs with average egg weight of 44.08 g. Egg production remained the same whereas 40 weeks egg weight increased by 1.04g in the S-5 generation as compared to the previous generation. Good fertility (91.50%) and hatchability (89.6 and 80.13 % on FES and TES) was observed in S-5 generation. Besides, the centre evaluated IWN and IWP strains up to 64 weeks of age in S-32 generation along with layer control population. In this generation, hen day egg production up to 64 weeks of age increased in both IWN and IWP by 0.2 eggs (267.9) and 4.6 eggs (256.8) respectively on phenotypic scale as compared to the previous generation. The centre has generated the revenue of Rs.18.78 lakhs and has supplied a total of 1,22,876 number of germplasms during the year. The number of farmers benefitted through the germplasm supply from the centre during the current year was 303.

Anand Centre evaluated the S-1 generation of *Ankleshwar* breed of chicken up to 40 weeks of age. Egg production of *Ankleshwar* chicken (S-1 gen) up to 40 weeks of age was 76.38, which was higher than in S-0 generation (71.06). S-2 generation of *Ankleshwar* chicken was produced and is being evaluated. The S-1 generation of IWN and IWP strains was evaluated up to 72 weeks of age. Egg production up to 72 weeks of age was higher in IWP (309.79) than IWN strain (307.24). S-2 generation of IWN and IWP strains was produced and is being evaluated. The S-8 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 (226.47) than IWK strain (218.14). The center has generated the revenue of Rs. 24.91 lakhs during the reporting year. The center has supplied a total of 55,528 germplasm during the reporting period.

Bengaluru centre evaluated native chicken, PB-1 and PB-2 lines and their crosses during the year. The five week body weight was 1126±4.74 and 1097±6.03 g in PB-1 and PB-2 lines, respectively. The egg production upto 40 weeks of age in PB-1 and PB-2 lines was 54.5 and 43 eggs, respectively. The body weight of native chicken at 8, 20 and 40 weeks of age was 384.9, 1208 and 1417 g, respectively. The phenotypic and genetic response of 5 week body weight in PB-1 was 16.41 and 30.68 g, respectively and corresponding values in PB-2 was 9.52 and 19.45 g, respectively. A total of 1,71,482 chicken germplasm were distributed to farmers. The centre generated revenue of Rs. 49.69 lakhs during the year.

Ludhiana centre carried out the evaluation of *Punjab Brown*, PB-1 and PB-2 lines during the year. The five week body weight was 1202 and 1000 g in PB-1 and PB-2 lines, respectively with corresponding FCR of 1.87 and 1.89, respectively. The egg production up to 40 weeks of age was 53.27 and 55.27 in PB-1 and PB-2 lines, respectively. In *Punjab Brown*, the 8 week body weight was 721.6 g with FCR of 3.9. The egg production up to 52 weeks of age was 99.26 eggs in *Punjab Brown*. The centre distributed 84,279 germplasm to the farmers. The centre generated revenue of Rs.24.42 lakhs.

ICAR-CARI, Izatnagar centre evaluated the local native chicken, CSML and CSFL during the period 2020-21. Body weight at 12 weeks of age was 1449 g in CSML x Desi cross. Body weight at 5 weeks in CSML and CSFL was 1198 and 1012 g, respectively. A total of 23,398

improved chicken germplasm was distributed to 36 farmers in Uttar Pradesh.

Bhubaneswar centre assigned to evaluate *Hansli*, CSML, CSFL and their crosses. *Hansli* birds were procured from the native tract to conserve and improve the flock in the farm.

Tripura centre evaluated *Tripura Black*, *Dahlem Red*, broiler dam line and their crosses during the year. The 40-week egg production was 53.77 and 42.95 eggs under farm and field conditions, respectively in BND cross (E4). The body weight at 8, 20 and 40 weeks of age were 515.81, 1605.12 and 1964.26 g at farm and 435.25, 1531.63 & 1772.40 g at farmers field respectively. During the period, a total of 31959 chicks were supplied to 516 farmers of Tripura with a revenue receipt of Rs. 20.86 lakhs.

Jabalpur Centre has evaluated the *Kadaknath*, Jabalpur colour and *Narmadanidhi* populations. The body weight at 40 weeks was 1970 and 1545g in Jabalpur colour and *Kadaknath*, respectively. The ASM was 155 and 168 days, respectively. The egg production up to 52 weeks of age was 160 eggs in Jabalpur colour and 93 eggs in *Kadaknath*. The 20 weeks body weight of *Narmadanidhi* was 1370 g for male and 1120 g for female birds under field conditions. A total of 2,961 chicken germplasm was distributed to 86 farmers with revenue receipts of Rs. 6.34 lakhs.

Guwahati centre evaluated native, *Dahlem Red*, PB-2 and BN populations up to 52 weeks of age along with *Daothigir* upto 40 weeks of age. The body weight at five weeks was 150.30 g in indigenous, 1180.60 g in PB-2 and 410.30 g in *Dahlem Red*. In native population the egg weight and egg production, up to 52 weeks was 40.80 g and 68.60 eggs, respectively. In *Kamrupa* the hen housed egg production upto 40 and 52 weeks of age was 49.90 and 91.30 eggs in the farm and corresponding values in the field were 44.30 and 74.80 eggs, respectively. For *Daothigir* the age at sexual maturity was 208.30 days. The hen housed egg production upto 40 weeks of age was 18.10 eggs. The centre supplied 40095 germplasm to 266 farmers with a revenue receipt of Rs. 5.12 lakhs during the year.

Ranchi centre evaluated native chicken, *Dahlem Red*, PB-2 and *Jharsim*. The hen day egg production of native population was 119 (G8) at 72 weeks of age. The body weight at day old and 4 weeks of age was 28.08±0.12 and 166.33±0.87 g in Native chicken during G9 generation. The native body weight and egg production showed improvement compared to previous evaluation. Centre supplied 18472 *Jharsim* chicks among 163 farmers, NGOs, KVKs and other agencies. The revenue receipt was Rs. 6.13 lakhs.

Palampur centre evaluated native germplasm, *Dahlem Red* and *Himsamridhi* during the year. The HDEP at 40 weeks and 52 weeks was 45.95 and 80.16 eggs, respectively in native chicken. The 40 weeks HDEP was 63.97 eggs *Dahlem Red*. The HDEP at 40 weeks and 52 weeks was 53.61 and 92.35 eggs respectively in Himasamridhi. A total of 53679 germplasm was distributed to the 466 farmers of Himachal hill region. An amount of Rs. 15.71 lakhs was generated as revenue.

Germplasm distribution and revenue generation during 2020-21

Centre	Germplasm (Nos.)	Revenue (Rs. In Lakhs)
KVASU, Mannuthy	122876	18.78
AAU, Anand	55528	24.91
KVAFSU, Bengaluru	171482	49.69
GADVASU, Ludhiana	84279	24.42
OUAT, Bhubaneswar	100	0.08
ICAR-CARI, Izatnagar	25038	0
NDVSU, Jabalpur	2961	6.34
MPUAT, Udaipur	31179	7.12
AAU, Guwahati	40095	5.12
CSKHPKVV, Palampur	54119	12.68
BAU, Ranchi	18472	6.13
ICAR-RC, Agartala	31959	20.86
Total	**6,38,088**	**176.13**

Udaipur centre evaluated *Mewari*, CSFL, RIR and *Pratapdhan* populations during the year. The body weight at 40 weeks of age was upto 1732 g in *Mewari* females. The egg production up to 52 weeks of age was 50.60 eggs in *Mewari* chicken. The annual egg production (up to 72 weeks of age) was 158.20 in *Pratapdhan* in field. The centre has evaluated meat type chicken germplasm under farm and field conditions. Seven training programmes were organized benefitting 405 tribal farmers under TSP component of the project. A total of 31,179 improved chicken germplasm was distributed to 557 farmers during the current year. The centre realized Rs 7.12 lakh revenue from the distribution of germplasm.

Poultry Seed Project

Poultry Seed Project was evolved with an objective to increase the availability of rural chicken germplasm in remote areas of our country. In this endeavour, the Indian Council of Agricultural Research has initiated "Poultry Seed Project" during the XI five year plan with six centres, three in the northeast region and three in different state veterinary/agricultural universities. The project has been strengthened during the XII plan by adding five more centres to cater to needs of the farmers in their respective regions. 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 Telanagna Veterinary University, Warangal; Sri Venkateswara Veterinary University, Tirupati and ICAR Research Complex for NEH Region, Umiam.

The Directorate as a coordinating unit, supplies parent chicks, co-ordinates and monitors the activities of different centres to enable them to achieve the set targets for each centre. The target set for supplying chicks for mainland and north-east centres during the year 2020-21 were between 0.5 and 1.0 lakhs chicks per annum for different centres and to collect feedback on the performance of the germplasm under backyard farm conditions. A total of 3,42,897 improved chicken varieties have been distributed in their respective regions/states with a revenue receipts of Rs. 149.83 lakhs during the year.

Two batches of *Vanaraja* and *Gramapriya* parents were reared at Patna Centre. A total of 50,495 commercial chicken germplasm was distributed to the farmers in Bihar during the year 2020-21 with an amount of Rs. 22.25 lakhs revenue.

One batch each of *Vanaraja* and *Srinidhi* were in position at Jharnapani centre. A total of 51,024 improved chicken germplasm was distributed to farmers of Nagaland and neighbouring states during the year 2020-21. A total of Rs. 30.45 lakhs revenue was generated under PSP at Jharnapani Centre.

Two batches of *Vanaraja* parents was reared at ICAR, NOFRI, Gangtok, Sikkim. A total of 69,241 improved chicken germplasm of *Vanaraja* was distributed to 1992 farmers covering 231 villages in Sikkim with an amount of Rs. 33.95 lakhs revenue. The centre achieved the set target of germplasm.

Three batches of *Vanaraja* and two batches of *Srinidhi* parents were reared at Manipur Centre during the year. A total 15,080 improved chicken germplasm was distributed to the farmers in Manipur. The Centre has generated Rs. 1.44 lakhs of revenue during the year 2020-21.

Two batches of *Vanaraja* and *Gramapriya* parents were reared at Hosur Centre during the reporting period. A total of 74,851 improved rural chicken (*Vanaraja* and *Gramapriya*) germplasm was distributed to 787 beneficiaries in Tamil Nadu. The Centre has generated total revenue of Rs. 23.42 lakhs during the year.

One batch each of *Vanaraja* and Krishibro parents were reared at Goa during the year. A total of 35,822 improved chicken germplasm was distributed to 951 farmers in Goa, Karnataka and Maharashtra with a revenue of Rs. 8.32 lakhs.

One batch of *Vanaraja* parents were reared under deep litter system at Port Blair. A total of 4503 improved chicken germplasm was distributed to farmers in Andaman & Nicobar Islands with revenue of Rs. 96625 during the year.

Two batches of *Vanaraja* parents reared at ICAR RC for NEH Region, Umiam, Barapani. A total 15,177 improved chicken germplasm was distributed to the farmers in Meghalaya with an amount of Rs. 9.95 lakhs of revenue.

Two batches of *Vanaraja* parents reared at Srinagar centre. A total of 17,260 improved chicken germplasm was distributed to the farmers of Jammu and Kashmir with an amount of Rs. 7.07 lakhs of revenue.

Two batches of *Vanaraja* parents were maintained at SVVU, Tirupati, Andhra Pradesh. A total of 29,157 chicks were supplied to the farmers and generated Rs.3.87 lakhs as revenue by sale of chicks and eggs during the period.

Five batches of *Vanaraja*, *Gramapriya* and *Vanasree* parents were reared at PVNRTVU, Warangal, Telangana during the reporting period. A total of 33,411 improved rural chicken germplasm was distributed to the farmers. The centre has generated total revenue of Rs. 8.15 lakhs during the period.

Centre wise distribution of germplasm under Poultry Seed Project

Centre	Germplasm (Nos.)	Revenue (Rs. In Lakhs)
BASU, Patna	50,495	22.25
WBUAFS, Kolkata	-	-
ICAR-RC, Jharnapani	51,024	30.45
ICAR-NOFRI, Gangtok	69,241	33.95
ICAR-RC, Imphal	15,080	1.44
TANUVAS, Hosur	74,851	23.42
ICAR-CCARI, Goa	35,822	8.32
ICAR-CIARI, Port Blair	4,503	0.96
SKUAST, Srinagar	14,631	7.07
ICAR-RC for NEHR, Umiam	15,177	9.95
PVNRTVU, Warangal	33,411	8.15
SVVU, Tirupati	29,157	3.87
Total	**342,897**	**149.83**

Budget

AICRP on Poultry Breeding

(Rs. in lakhs)

AICRP Centre	Actual budget released (ICAR share)	Budget for (State share)	Total expenditure	Expenditure on feed	Receipts
KVASU, Mannuthy	76.00	25.34	81.00	29.77	18.78
AAU, Anand	67.15	22.38	82.86	42.20	24.91
KVAFSU, Bengaluru	84.00	28.01	96.29	31.35	49.69
GADVASU, Ludhiana	69.31	23.09	82.67	20.00	24.42
OUAT, Bhubaneswar	41.07	13.69	34.79	1.70	0.08
NDVSU, Jabalpur	74.60	24.86	85.96	21.75	6.34
MPUAT, Udaipur	77.50	25.84	103.40	12.04	7.12
AAU, Guwahati	58.72	19.58	78.29	15.11	5.12
CSKHPKV, Palampur	73.95	24.65	99.78	17.22	12.68
BAU, Ranchi	55.90	18.63	33.89	16.14	6.13
ICAR RC NEH, Agartala	40.98	0.00	40.02	22.25	20.86
ICAR-CARI, Izatnagar	-	-	-	-	-
Total	**719.18**	**226.07**	**818.95**	**229.53**	**176.13**

Poultry Seed Project

(Rs. in lakhs)

Centre	Budget released (2020-21)	Expenditure	Receipt, if any
WBUAFS, Kolkata	2.42	--	--
BASU, Patna	33.32	26.49	22.25
ICAR-RC, Jharnapani	97.00	94.89	30.45
ICAR-NOFRI, Gangtok	84.00	72.48	33.95
ICAR-RC, Imphal	64.00	43.90	1.44
TANUVAS, Hosur	44.72	44.72	23.42
ICAR-CCARI, Goa	20.20	17.41	8.32
ICAR-CIARI, Port Blair	21.60	16.71	0.96
SKUAST, Srinagar	18.64	23.88	7.07
ICAR-RC for NEH, Umiam	72.50	50.97	9.95
PVNRTVU, Warangal	45.70	45.62	8.15
SVVU, Tirupati	45.90	42.30	3.87
Total	**550.00**	**479.37**	**149.83**

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-à-vis those available in the market from other hatchery sources and maintenance of the elite stocks of layers and broilers available in the country/to be imported from abroad in future and to undertake their genetic description and characterisation with respect

Location of the centres

A. AICRP on poultry breeding

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

*Control Population Unit

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

Technical Program

Technical Programme in brief for the year 2020-2021

- 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

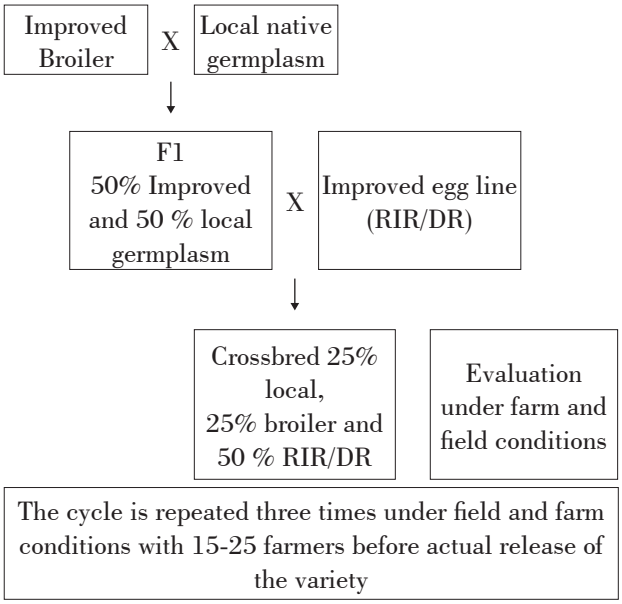
Development of crosses

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

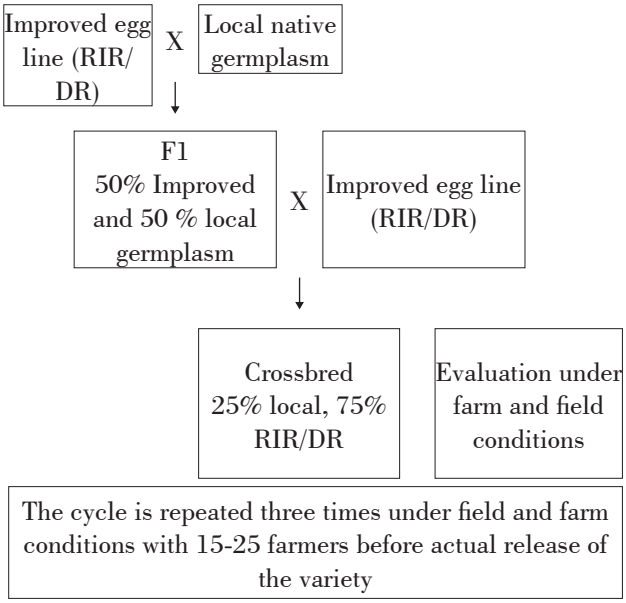
Flocks to be selected for Rural Poultry

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

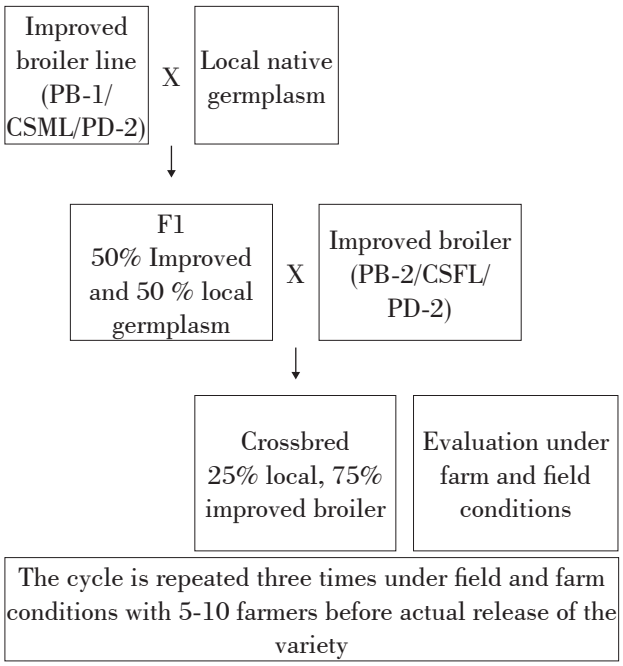
Technical program: Dual Type chicken



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 progeny for each dam at the time of housing the suitable numbers of chicks are to be hatched.

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

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

B. Technical programme for Broilers

Development of sire and dam line population:

1. Broiler centres will work on maintenance of elite broiler populations.
2. Collection, characterization and conservation of local native germ plasm.
3. Production and evaluation of crosses under farm and field conditions.
4. Development of location specific varieties and impact assessment
5. The centres will continue to develop the existing female line available with them.
6. Centres involved in development of dam line population will produce 3,500 chicks in each generation.
7. It is expected that at least 3000 chicks will contribute to data at 5 weeks for making necessary selection.
8. Between 5th and 6th week, a total of 1200 females will be selected based on five week body weight.
9. A total of 250 best males will also be selected on body weight at 5 week.
10. At the age of 12 weeks a physical selection will be taken up and 1000 females without any physical defects will be retained and 200 males will also be retained after screening them for satisfactory physical appearance.
11. About 500 females will be housed in individual cages.
12. Simultaneously, 150 best males out of the 200 males will also be housed in cages or on deep litter.
13. The females will be evaluated for dam line traits till the time the youngest hatch attains 40 weeks of age and sire family selection will be practiced.
14. Out of the surviving females, a total of 350 females will be selected and will be mated to 70 best males selected from the available 200 males housed at 18 weeks of age to obtain replacement progeny (The artificial insemination is mandatory to reproduce the next generation so as to ensure high percentage fertility and good number of chicks).
15. It is estimated that in 4 to 5 hatches of 7 to 10 days interval, the required number of chicks can be reproduced from the 350 selected female breeders mated to 70 selected male breeders.

16. The criterion of selection, for the females, will be the sire means for settable egg production. Similarly, the males from the sire families from which females have been chosen will be selected as male parents.
17. The shape index of the eggs needs to be measured at 32 weeks of age by measuring the length and width of egg. It is desirable to measure the shape index for five consecutive days. The acceptable shape index is suggested as 1.30 to 1.50.

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

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

ICAR-DPR, Hyderabad

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

Programme for Broiler Control population

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

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

1. Body weight at day old 5, 20 and 40 weeks of age
2. Feed consumption to 5 weeks of age
3. Age at first egg
4. Egg production to 40 weeks of age
5. Egg weight at 40 weeks of age
6. Per cent fertility and hatchability on total and fertile eggs set
7. Mortality during the following periods 0-5 weeks, 6-20 weeks, 21-40 weeks
8. Restricted feeding programme is to be practiced from 6 to 20th week.
9. About 300 to 400 hatching eggs of Control line are to be supplied to each of the broiler centres of the ICAR- Directorate of Poultry Research during their hatching season, for evaluation of environmental trends.

Nutrient	Chicks 0-5 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

Kerala Veterinary and Animal Sciences University, Mannuthy (Kerala)

Activities assigned

- Conservation, characterization and improve-ment 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 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-5 generation of native chicken was evaluated up to 40 weeks.
- S-6 generation of native chicken was produced and evaluated up to 8 weeks of age.
- IWN (900 hens) and IWP (879 hens) strains in S-32 generation have completed testing up to 64 weeks of age.
- The body weights recorded at 16, 40 and 64 weeks of age was 961, 1504 and 1558g, respectively for IWN and 926, 1437 and 1471g, respectively for IWP strains.
- The sexual maturity was 141.9 and 140.8 days in IWN and IWP, respectively.
- The hen-housed egg production up to 64 weeks of age was 262.4 in IWN and 249.6 in IWP strain. The values of hen-day and survivors' egg production up to 64 weeks of age were 267.9 and 268.0 respectively in IWN and 256.8 and 257.1, respectively in IWP strain in S-32 generation.
- The egg weight at 64 weeks of age was 51.83 and 51.06g, respectively in IWN and IWP strains.
- The male of IWN strain was crossed with native female and, the male chicks of this two-way cross, (150 number) were selected and reared. The males of this two-way cross were crossed with RIR female and the three-way cross was produced and evaluated in farm condition up to 40 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 chickens

A population of native chicken of S-5 generation was evaluated up to 40 weeks of age and its production performance is presented in Table 1. Hen housed egg production up to 40 weeks of age remains the same in S-5 generation when compared to S-4 generation (Table 1).

Fertility and hatchability

The S-6 generation of native chickens was produced by pedigree mating and its performance was evaluated up to 8 weeks of age. The number of sires and dams used for breeding to produce the S-6 generation was 50 and

Table 1. Growth and production performances in S-5 generation of native chicken

Traits	N	Mean ±SE
Body weight (g)		19.30
Day old	473	28.68±0.13
4 wks	311	236.0±2.04
8 wks	217	437.3±5.08
12 wks	102	736±11.5
16 wks	611	887±4.0
40 wks	567	1300±7.8
ASM (d)	587	156±0.4
Egg weight (g)		
28 wks	531	39.15±0.15
40 wks	449	44.08±0.18
EP 40 wks (Nos.)		
Hen housed	595	78.95±0.96
Hen day	-	80.22
Survivors	571	80.40±0.93

Table 2. Summary of incubation records for last three generations of native chicken

Gens.	No. of hatch-es	Eggs set (Nos.)	Fer-tility (%)	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

250 (1:5). Fertility slightly reduced while hatchability increased in S-6 generation as compared to the previous generation (Table 2).

Juvenile growth traits: Body weights at 8 weeks of age in both male and females increased in S-6 generation over S-5 generation (Table 3).

Growth traits

Results of body weight recorded at various intervals of both male and female birds, ASM and egg weight recorded at 28 and 40 weeks of age is presented in Table 4. The egg weight increased at 28 and 40 weeks in S-5 generation over S-4 generation. Egg production up to 40 weeks of age of previous generation was maintained in the present generation.

Mortality in native birds

The mortality during 17-40 weeks in S-5 generation was within the permissible level. Less mortality was observed during 0-8 weeks of age in S-6 generation. (Table 5).

Performance evaluation of three-way cross

The male of IWN strain was crossed with native female, and the male of this two-way cross were crossed with RIR female to produce the three-way cross. During the current year the three way cross produced was evaluated in farm conditions up to 40 weeks of age and results are given in Table 6.

B. Improvement of IWN and IWP strains of White Leghorn

The centre evaluated the S-32 generation of IWN and IWP strains up to 64 weeks of age.

Table 3. Body weights (g) of native chicken in S-6 generation

Age	Female		Male	
	N	Mean ±SE	N	Mean ±SE
Day old	176	31.53±0.21	385	32.17±0.14
4 wks	358	254.3±2.17	404	264.6±2.16
8 wks	352	549.3±4.50	255	638.3±5.43

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

Traits	Females			Males		
	S-5	S-4	S-3	S-5	S-4	S-3
Body weight (g)						
0 day	**28.68**	28.47	31.7	28.50	27.37	32.43
4 wks	**236.0**	168.4	260.4	245.6	171.3	247.92
8 wks	**437.3**	456.5	408.1	553.4	577.5	504.39
12 wks	**886.9**	917.3	881.6	1164	1248	1225
ASM (d)	**155.9**	**142.6**	154.2	-	-	-
Egg weight (g)						
28 wks	**39.15**	38.25	39.30	-	-	-
40 wks	**44.08**	43.04	43.37	-	-	-
EP 40 wks (Nos.)						
Hen housed	**78.95**	78.95	79.20	-	-	-
Hen day	**80.22**	82.30	82.33	-	-	-
Survi-vors'	**80.40**	83.10	84.90	-	-	-

Selection records:

The summary of selection records for last five generations is presented in Table 7.

Incubation records

Fertility in S-32 generation of IWN and IWP strains was more or less equal to previous generation. Hatchability on total and fertile egg set basis in IWN and IWP populations were higher as compared to previous generation (Table 8).

Mortality

The mortality figures of IWN and IWP strains during S-32 generation from 17 to 40 weeks and from 17 to 64 weeks of age are presented in Table - 9. The mortality of IWN strain during different periods is within the stipulated limit. However, the mortality in IWN strain during 17-64 weeks of age was slightly higher than the maximum expected level of 1% mortality per month.

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 are presented in Table 10. The hen day egg production up to 64 weeks of age increased by 0.2 eggs and 4.2 eggs in IWN and IWP strains, respectively. The survivors' egg production up to 64 weeks of age was marginally lesser in both strains when compared to previous generation.

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

Gens.	0-8 wks			9-16 wks			17-40 wks		
	No. Housed	No. Died	Mortality (%)	No. Housed	No. Died	Mortality (%)	No. Housed	No. Died	Mortality (%)
S-4	1559	14	0.89	1319	17	1.28	622	21	3.38
S-5	1215	30	2.47	1185	54	4.56	611	31	5.07
S-6	**1565**	**37**	**2.36**	**-**	**-**	**-**	**-**	**-**	**-**

Egg number

The birds IWN, IWP and control population in S-32 generation were evaluated for growth and production performance up to 64 weeks of age during the reporting period. The body weight, egg production up to 40 weeks and 64 weeks of age and egg weights at different age are presented in Table 11.

ASM and body weights

The phenotypic response for sexual maturity for IWN and IWP strains of S-32 generation was -2.39 and 1.24 days when compared with the previous generation (Table 12). The body weights recorded at 16, 40 and 64 weeks of age was 961, 1504 and 1558g, respectively for IWN and 926, 1437 and 1471g, respectively for IWP strains.

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 in control population it was maximum in the class interval of 221-240 (Table 13). The trend was similar to that of earlier generation.

Egg weight

The egg weight at 40 weeks of age increased by 0.62 and 1.17g respectively in IWN and IWP strains in S-32 generation compared to last generation. However, egg weight at 40 and 64 weeks of age marginally decreased in IWN and IWP strains in S-32 generation compared to last generation (Table 14).

Heritability estimates

In IWN strain, heritability estimate (S+D) of egg production up to 40 and 64 weeks was high in magnitude (Table 15). The heritability estimate (S+D) was high in magnitude for ASM, EW28, EW40 and EW64. In egg weight trait, the heritability estimates from dam components was higher than sire component. The heritability estimates (S+D) were high in magnitude for BW16, BW40 and BW64. In IWP strain, heritability estimate (S+D) of ASM, and egg production up to 40 weeks and 64 weeks were low in magnitude. The

Table 6. The performance of three way cross at farm condition

Traits	Female		Male	
Body weight (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
12wks	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
ASM (d)	503	155.8±0.6		
Egg weight (g)				
28 wk	469	47.51±0.17	-	-
40 wk	316	50.46±0.25	-	-
EP to 40 wks (Nos)				
Hen housed	478	84.76±1.05	-	-
Hen day	-	94.68	-	-
Survivors'	425	87.80±0.97	-	-

Table 7. Selection records of IWN and IWP strains for last five 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 8. Incubation records of IWN and IWP strains in last three generations

Gens.	Strains	Hatches (Nos.)	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
						TES	FES
S-30	IWN	3	6156	88.55	4865	79.60	89.83
	IWP	3	7017	83.64	5110	73.34	87.69
	Control	**1**	**590**	**84.74**	**470**	**90.60**	**98.75**
S-31	IWN	3	6980	88.86	4903	70.94	86.66
	IWP	3	6404	85.09	4073	64.27	85.58
	Control	**1**	**595**	**90.42**	**490**	**84.03**	**92.93**
S-32	IWN	2	5091	89.13	4038	79.32	87.17
	IWP	2	4631	84.30	3258	70.35	85.65
	Control	**1**	**605**	**29.09**	**174**	**28.76**	**51.03**

Table 9. Mortality percentage at different ages in last five generations

Gens.	Strains	0-8 wks	9-16 wks	17-40 wks	17-64 wks
S-30	IWN	4.89	1.45	6.75	16.08
	IWP	2.09	2.35	7.70	17.84
	Control	**1.20**	**4.40**	**5.40**	**8.84**
S-31	IWN	6.57	4.05	3.43	4.27
	IWP	6.04	3.35	5.87	7.87
	Control	**2.65**	**0**	**3.75**	**8.75**
S-32	IWN	3.97	0.97	2.29	5.45
	IWP	5.82	1.41	3.67	12.67
	Control	**4.59**	**0.00**	**5.48**	**4.35**

Table 10. Egg production up to 64 weeks of different strains since last three generations

Traits	IWN			IWP			Control		
	HH64	HD64	Sur64	HH64	HD64	Sur64	HH64	HD64	Sur64
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**	**267.9**	**268.0**	**249.6**	**256.8**	**257.1**	**172.2**	**179.6**	**180.7**

Table 11. 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±0.1	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

Table 12. ASM and body weights of different strains at 64 weeks in last three generations

Gens.	IWN		IWP		Control	
	ASM (d)	BW64 (g)	ASM (d)	BW64 (g)	ASM (d)	BW64 (d)
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

heritability estimates (S+D) were high in magnitude for BW16, BW40 and BW64 in IWP strain.

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 genetic response for hen housed, hen day and survivor egg production up to 64 weeks was positive in IWP strain whereas it was positive only for survivors' egg production in IWN strain in S-32 generation (Table 16).

Supply of germplasm

Total germplasm supply from the centre was 1,22,876 and 303 farmers were benefitted through the supply of germplasm during 2020-21.

Revenue generation

The centre has generated the revenue of Rs.18.78 lakhs during 2020-21 which is 94.32% of the recurring expenditure.

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

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

Table 14. Mean egg weights at various ages in last three generations in different strains

Strains	Gens.	Egg weight (g)		
		28 wks	40 wks	64 wks
IWN	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**
IWP	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**
Control	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**

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
	EW64	**0.13±0.08**	**0.00±0.00**	**0.06±0.05**

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

	Phenotypic		Genetic	
Traits	**IWN**	**IWP**	**IWN**	**IWP**
AFE (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 improve-ment 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
- 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-1 generation of *Ankleshwar* chicken was evaluated up to 40 weeks of age.
- The S-2 generation of *Ankleshwar* chicken was produced and is being evaluated.
- The S-1 generation of IWN and IWP strain was evaluated up to 72 weeks of age.
- The S-2 generation of IWN and IWP strain was produced and is being evaluated.
- The S-8 generation of IWD and IWK strains was evaluated up to 64 weeks of age.
- The S-9 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 germplasm (S-1 gen)

During the reporting period, birds of S-1 generation of *Ankleshwar* breed were produced and evaluated up to 40 weeks of age. A total of 1310 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-1 generation as compared to S-0 generation. Fertility has increased in S-2 generation as compared to S-1 generation. Hatchability on FES basis has decreased in S-2 generation as compared to S-1 generation, while hatchability on TES basis increased in S-2 generation as compared to S-1 generation (Table 17).

Production performance

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

Mortality

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

B. Improvement of IWN and IWP strains of White Leghorn

During the period under report the S-1 generation of IWN and IWP strains was evaluated up to 72 weeks of age. S-2 generation of IWN and IWP strains is being evaluated at present. 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 during three generations is presented in Table 21. Hatchability was better in control population as compared to IWN and IWP strains in S-2 generation.

Mortality

Mortality of IWN, IWP and control population birds was under permissible limit during all the stages (Table 22).

Table 17. Incubation records of *Ankleshwar* breed for last three generations

Gens.	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**

Table 18. Production performance of *Ankleshwar* breed

Traits	S-1 Gen.		S-0 Gen.	
	N	Mean ± S.E.	N	Mean ± S.E.
ASM (d)	1058	150.8±0.32	1441	156.8±0.40
Body weight (g)				
16 wks	1310	936.9±2.66	1481	1002.9±2.89
40 wks	1033	1548±4.95	1405	1545±7.96
EP 40 wks, Nos.				
Survivors'	1033	76.4±0.63	1405	71.1±0.62
Hen housed	1310	65.6±0.70	1481	68.7±0.65
Hen day	-	73.30	-	70.12
Egg weight (g)				
28 wks	1024	37.81±0.11	1215	37.05±0.09
40 wks	774	42.73±0.13	1136	43.76±0.11
Feed cons./bird (kg) 17-40 wks	-	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**

Table 20. Selection records of IWN and IWP strain in S-0 to S-1 generation

Particulars	IWN	IWP
No. of sires used	50	50
No. of dams used	300	300
No. of sires contributed to the next generation	50	50
No. of dams contributed to the next generation	226	247
Effective Nos. using Sr. No.3 & 4	163.77	166.33
Rate of inbreeding	0.0030	0.0030
Expected S. D. in females of S-0 generation	10.56	17.94
Phenotypic standard deviation of S-0 generation	16.01	28.79
Intensity of selection	0.660	0.623
Heritability of 64 weeks egg production of S-0 generation	0.13	0.20
Expected response	1.37	3.59

Production performance of IWN and IWP strains and Control population (S-1 gen)

The production performance of IWN and IWP strains and control population during S-1 generation is presented in Table 23. A total of 372, 351 and 180 pullets of IWN and IWP strains, and control population were housed individually at 16 weeks of age, respectively.

Growth performance

The growth performance of IWN, IWP and control population up to 72 weeks of age in S-1 generation is presented in Table 9. Body weight recorded at 16 weeks of age was almost similar in IWN, IWP and control population. Body weight at 40 weeks of age was higher in control population as compared to IWN and IWP strains. Body weight recorded at 64 weeks of age was almost similar in IWN, IWP and control population. Body weight at 72 weeks of age was almost similar in IWN and IWP strains.

Egg production performance of IWN, IWP strains and Control population (S-1 gen)

Egg production up to 40 and 64 weeks of age was higher in IWP than IWN strain and control population (Table

Table 21. Incubation records of IWN, IWP and control population during last three generations

Gens.	Strains	Eggs set (Nos.)	Good chicks (Nos.)	Fertility (%)	Hatchability (%)	
					FES	TES
S-0	IWN	2181	1842	94.96	90.49	85.92
	IWP	2207	1856	92.48	92.16	85.23
	Control	807	610	90.33	86.69	78.31
S-1	IWN	1258	890	88.31	84.52	74.64
	IWP	1455	1001	86.12	85.00	73.20
	Control	812	661	89.66	93.13	83.50
S-2	**IWN**	**1432**	**1061**	**85.68**	**89.32**	**76.54**
	IWP	**1385**	**930**	**84.26**	**84.06**	**70.83**
	Control	**786**	**622**	**85.62**	**93.91**	**80.41**

Table 22. Mortality of IWN, IWP and Control population during last two 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**

25). Egg production up to 72 weeks of age was higher in IWP than IWN strain (Table 25).

Feed consumption

Feed consumption from 17-72 weeks of age in IWN and IWP strains in S-1 generation was almost similar (Table 25).

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-1 generation (Table 9). Egg weight at 40 weeks of age was higher in IWP strain as compared to IWN strain and control population in S-1 generation (Table 9). Egg weight at 64 weeks of age was higher in IWN strain as compared to IWP strain and control population in S-1 generation (Table 9). Egg weight at 72 weeks of age was almost similar in IWN and IWP strains in S-1 generation (Table 9).

C. Improvement of IWD and IWK strains of White Leghorn

Incubation records

The summary of incubation records of IWD and IWK during last two generations presented in Table 26. Fertility was lower in S-9 generation as compared to S-8 generation in IWD and IWK strains. Hatchability on TES basis was higher in S-8 generation as compared to S-9 generation. Hatchability on FES basis was lower in S-8 generation as compared to S-9 generation in IWD and IWK strains.

Performance of IWD and IWK strains (S-8 Gen.)

Performance of IWD and IWK strains in S-8 generation is presented in Table 27. Age at sexual maturity in IWD and IWK strains was lower in S-8 generation as compared to S-7 generation. Body weight at 16 weeks of age in IWD and IWK strains was lower in S-8 generation as compared to S-7 generation. Egg production up to 64 weeks of age in IWD and IWK strains was lower in S-8 generation as compared to S-7 generation. Egg weight at 28 and 64 weeks of age was almost similar in IWD and IWK strains during S-8 generation. Feed consumption was almost similar in both the strains. Mortality was within permissible limit in both the strains.

Table 23. Egg production in IWN, IWP and Control population during two generations

Traits	Gens.	IWN	IWP	Control
EP40	S-0	122.69	121.13	101.63
	S-1	130.50	133.40	107.75
EP64	S-0	280.45	266.96	218.80
	S-1	268.60	271.66	210.56
EP72	**S-0**	**324.46**	**306.28**	**-**
	S-1	**307.24**	**309.79**	**-**

Table 24. Age at sexual maturity and egg weights in IWN, IWP and control populaion during last two generations

Traits	Gens.	IWN	IWP	Control
ASM	S-0	143.7	140.5	148.8
	S-1	133.8	130.9	145.7
EW40	S-0	52.33	53.31	51.62
	S-1	52.05	52.69	52.34
EW64	**S-0**	**55.30**	**54.17**	**55.95**
	S-1	**54.59**	**54.29**	**53.84**

Table 25. The performance of IWN and IWP strains and control population in S-1 generation

Traits		IWN		IWP		Control	
		N	Mean ± S.E.	N	Mean ± S.E.	N	Mean ± S.E.
Pullets housed		372		351		180	
ASM (d)		372	133.9±0.43	346	131.0±0.40	180	145.7±0.64
Body weight (g)							
	16 wks	372	1060±5.30	351	1068±4.17	180	1044±5.57
	40 wks	362	1540±6.55	344	1581±6.81	178	1652±11.65
	64 wks	352	1672±8.09	333	1678±8.79	174	1693±15.20
	72 wks	348	1674±7.32	328	1685±8.20	-	-
EP 40 wks (Nos.)							
	Survivors'	362	130.5±0.7	344	133.4±0.9	178	107.8±1.3
	HH	372	127.2±0.9	351	129.4±1.0	180	106.1±1.4
	HD	-	128.7	-	130.5	-	106.6
EP 64 wks (Nos.)							
	Survivors'	352	268.6±1.4	333	271.7±1.6	174	210.5±2.4
	Hen housed	372	256.5±2.2	351	260.7±2.1	180	193.2±2.6
	Hen day	-	262.5	-	266.2	-	196.0
EP 72 wks (Nos.)							
	Survivors'	348	307.2±1.7	328	309.8±2.0	-	-
	Hen housed	372	294.3±2.8	351	299.6±2.6	-	-
	Hen day	-	303.0	-	307.6	-	-
Egg weight (g)							
	28 wks	369	50.28±0.16	348	50.46±0.13	174	50.08±0.25
	40 wks	361	52.05±0.15	342	52.69±0.14	163	52.34±0.26
	64 wks	350	54.59±0.11	331	54.29±0.12	142	53.84±0.25
	72 wks	280	55.17±0.15	295	55.16±0.16	-	-
Feed consumption / bird (kg)							
	17-40 wks	-	17.39	-	16.99	-	16.50
	17-64 wks	-	36.02	-	35.62	-	35.05
	17-72 wks	-	42.24	-	41.72	-	-
Mortality (%)							
	17-40 wks	-	2.69	-	1.99	-	1.11
	17-64 wks	-	5.38	-	3.42	-	3.33
	17-72 wks	-	6.45	-	6.55	-	-

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

Gens.	Strains	Eggs set (Nos.)	Good chicks (Nos.)	Fertility (%)	Hatchability (%)	
					FES	TES
S-7	IWD	996	845	94.58	90.66	85.74
	IWK	910	820	95.82	94.95	90.99
S-8	IWD	908	657	95.48	78.31	74.78
	IWK	881	649	95.69	81.85	78.32
S-9	**IWD**	**1183**	**734**	**78.78**	**83.05**	**65.43**
	IWK	**987**	**659**	**80.04**	**86.58**	**69.30**

Table 27. The production performance of IWD and IWK strains (S-8 gen)

Traits		IWD		IWK	
		N	Mean ± S.E.	N	Mean ± S.E.
Pullets housed		200		200	
ASM (d)		200	140.0±0.58	200	138.4±0.66
Body weight (g)					
	16 wks	200	1066±5.2	200	1023±5.9
	40 wks	199	1652±8.4	194	1590±14.8
	64 wks	192	1657±13.2	183	1660±13.9
EP 40 wks (Nos.)					
	Survivors'	199	116.7±1.3	194	114.7±1.3
	Hen housed	200	114.6±1.3	200	110.7±1.6
	Hen day	-	114.9	-	111.9
EP 64 wks (Nos.)					
	Survivors'	192	226.5±3.2	183	218.1±2.8
	Hen housed	200	218.3±3.4	200	205.1±3.5
	Hen day	-	221.8	-	213.3
Egg weight (g)					
	28 wks	170	50.08±0.22	194	50.22±0.16
	40 wks	192	51.58±0.17	186	52.03±0.24
	64 wks	136	54.88±0.29	131	54.70±0.22
Feed consumption / bird (kg)					
	0-8 wks	-	1.59	-	1.60
	9-16 wks	-	3.50	-	3.56
	17-40 wks	-	17.1	-	17.5
	17-64 wks	-	35.9		36.0
Mortality (%)					
	0-8 wks	-	5.78	-	2.47
	9-16 wks	-	2.92	-	1.35
	17-40 wks	-	0.50	-	3.00
	17-64 wks	-	4.00	-	8.50

Implementation of DAPSC/ SCSP Component

A total 48 beneficiaries of 8 different nearby Taluka of Anand District were selected. "Kit Distribution Programme to beneficiaries was organized and each beneficiary was given one unit as input. One unit includes 24 grown up chicks of *Ankleshwar* breed, one feeder, one drinker, one catching crate (as Night Shelter), 50 kg poultry feed (Grower mash) and one text book of "Poultry Farming" in Gujarati language.

Germplasm supply

In spite of COVID-19 situation, the centre has supplied a total of 55,528 number of germplasms during the year 2020-21. A total of 820 farmers were benefited, among them, 110 farmers were directly benefited and 710 farmers were benefited through IPDP centers, KVK and NGO.

Revenue generation

The center has generated the revenue of Rs. 24.91 lakhs during the reporting period, which was 59.10% of the total expenditure of feed cost (42.15 lakhs). The total expenditure incurred on feed was Rs. 42.15 lakhs (Rs. 27.02 lakhs from AICRP + Rs. 15.13 lakhs from development grant and Anand Agricultural University research projects).

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

Activities assigned

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

Action taken during 2020-21

- Centre completed purification of local native chicken
- and evaluated for growth and production
- The S-5 generation of native chicks produced.
- Production traits of PB-1 (S-12), PB-2 (S-25) and Control lines were evaluated.
- The S-13 and S-26 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 four generations. Birds with uniform attractive plumage colour were retained and solid black coloured and pure white plumage birds were culled. The egg production and other production traits in native birds (S-4) were evaluated. The average age at sexual maturity was 165.73 days. Egg weight at 28th week was 39.92 g and at 40th week was 41.72 g (Table 28). S-5 generation of native chicken was produced. A total of 1427 good chicks were produced. The average body weight of day old and 8 week of native chicken was 28.03 and 384.9 g, respectively. The feed efficiency at 0-8 week was 3.22. The overall survivability percentage was 92.23 up to 0-8 weeks.

Table 28. Body weight and egg weight in native birds (S-4)

Traits		N	Mean ± SE
Body weight (g)			
	20 wks	566	1208 ± 9.27
	40 wks	247	1417± 19.44
	52 wks	237	1645± 24.77
ASM (d)		289	165.7 ± 0.67
Egg weight (g)			
	28 wks	300	39.92
	40 wks	300	41.72

Conservation and utilization of elite germplasm

Selection records

The number of sires and dams contributed to next generation were 32 and 256 in PB-1, 14 and 126 in PB-2, respectively. The effective number of parents was 108 in PB-1 and 59 in PB-2. Average selection differential for bodyweight at 5 weeks was 88 and 71 g, respectively in PB-1 and PB-2 lines. Summary of selection records of PB-1 and PB-2 are presented in Table 23. In both PB-1 and PB-2, selection differential decreased compared to previous generation.

Incubation records

The fertility and hatchability records of PB-1, PB-2 and control populations are presented in Table 30. During the current year, a total of 1378 and 642 good chicks were hatched in PB-1 and PB-2 populations, respectively.

Table 29. Summary of selection records

Parameters	PB-1		PB-2	
	S-12	S-13	S-25	S-26
Sires	32	32	16	14
Dams	256	256	128	126
Sires contributed	32	32	16	14
Dams contributed	251	244	128	119
Effective number	116	108	70	59
Rate of Inbreeding	0.0039	0.0036	0.0057	0.0092
SD for male (g)	159	152	112	141
SD for female (g)	76	61	52	53
Average selection differential (g)	94	88	83	71
Selection intensity (σ)	0.45	0.47	0.41	0.39

Table 30. Incubation records for PB-1, PB-2, and control line

Gen.	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-12	1850	88.65	1420	78.81	88.90
S-13	**1831**	**88.80**	**1378**	**77.28**	**90.07**
PB-2					
S-25	961	84.18	705	74.30	88.26
S-26	**843**	**90.15**	**642**	**77.70**	**86.18**
Control					
S-25	189	66.14	113	60.84	92.00
S-26	-	-	-	-	-

Fertility and hatchability (TES) slightly improved in PB-2 lines compared to last generation. Control line could not be procured due to lockdown.

Mortality

The mortality in the present generation during 0 to 5 weeks was 3.56 and 4.21% in PB-1 and PB-2 lines, respectively. Mortality during 0-5 weeks of age increased in PB-1 and PB-2 lines compared to previous generation. Mortality during 6-16 weeks of age significantly increased in PB-1 Line (Table 31).

Body weight and feed efficiency

The day old body weight recorded in PB-1 and PB-2 lines were 42.72 and 42.40 g, respectively. Five week body weight maintained in PB-2 line where as decreased in PB-1 line as compared to previous generation. In the current year, feed conversion ratio showed marginal improvement in PB-2 line over previous generation (Table 32).

Table 31. Mortality for PB-1, PB-2 and control line (%)

Gen.	0-5 wks	6-16 wks	17-40 wks
PB-1			
S-12	1.90	0.93	5.79
S-12	**3.56**	**16.03**	**3.30**
PB-2			
S-25	1.84	6.07	13.06
S-25	**4.21**	**1.46**	**0.63**
Control			
S-25	5.31	7.48	4.4
S-25	-	-	-

Table 32. 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-12	43.39 (1420)	1247 ± 3.81 (1393)	2.09
S-13	**42.72 (1378)**	**1124 ± 4.74 (1329)**	**2.11**
PB-2			
S-25	42.92 (705)	1093 ± 6.40 (692)	2.21
S-26	**42.40 (642)**	**1097 ± 6.03 (615)**	**2.09**
Control			
S-25	39.11 (113)	717.6 ± 12.8 (107)	2.38
S-26	-	-	-

Figures in parenthesis indicate number of observations

Frequency distribution of 5 week body weight

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

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 33, 34 and 35. The average body weight at 20 week recorded in PB-1 (S-13) was 2236 g. Corresponding values in PB-2 (S-25) was 2489 g, respectively. The body weight at 20 week of age increased in PB-1 line in the present generation, more than the target body weight. Proper feed restriction should be followed to maintain the target body weight.

The ASM recorded in S-12 of PB-1 and S-25 of PB-2 lines were 191.43 and 187.37 days, respectively. Increase of ASM was observed in PB-2 line, whereas it maintained in PB-1 line as compared to previous generation.

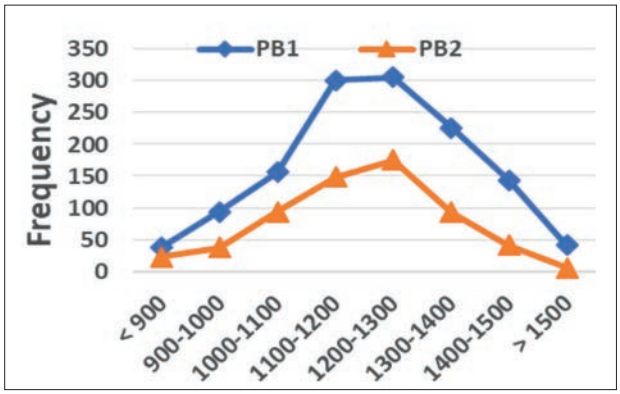


Fig 1. Frequency distribution of 5thweek body weight in PB-1 and PB-2 lines

Table 33. Adult body weight at 20 and 40 wks of females in different lines

Gen.	Body weight (g)	
	20 wks	40 wks
	PB-1	
S-12	2390±22.85 (450)	3330±24.82 (251)
S-13	2236±19.41 (515)	2861±26.92 (244)
S-14	**2460±18.45 (353)**	**NC**
	PB-2	
S-24	2550±28.91 (218)	3130±32.10 (127)
S-25	2489±40.99 (221)	3488±36.38 (109)
S-26	**2320±20.05 (243)**	**NC**
	Control	
S-24	2120±42.95 (38)	2650±52.92 (32)
S-25	**1720±44.95 (42)**	**3100±79.90 (34)**

Figures in parenthesis indicate number of observations

The average egg production at 40 weeks of age (survivor basis) in PB-1 (S-12), PB-2 (S-25) and control (S-25) lines were 54.52, 43.00 and 47.52 eggs, respectively. Corresponding production at 52 weeks of age were 95.02, 104.12 and 99.82 eggs, respectively. The egg production up to 40 weeks of age decreased in PB-2 and control lines.

Response

The average phenotypic (over 13 generations) and genetic response (over 12 generations) of 5 week body weight in PB-1 was 16.41 and 30.68 g, respectively (Fig. 2). Corresponding values for egg production (over 13 generations) up to 40 weeks of age in PB-1 was -0.81 and -1.18 eggs (Fig. 4). The average phenotypic (over 15 generation) and genetic (over 14 generation) response of 5 week body weight in PB-2 was 9.52 and 19.45 g, respectively (Fig. 3). Corresponding values for egg production in PB-2 up to 40 week over 14 generations was -1.163 and -1.23 eggs (Fig. 5).

Table 34. Age at sexual maturity and egg weight in different lines

Gen.	ASM (days)	Egg wt (g) at 32 wks
	PB-1	
S-11	191.90± 0.69 (256)	60.04±0.51 (100)
S-12	**191.43± 0.88 (221)**	**58.77±0.50 (150)**
	PB-2	
S-24	174.15±1.18 (128)	56.65±0.52 (100)
S-25	**187.37±0.56 (126)**	**57.52±0.47 (85)**
	Control	
S-24	183.26±0.72 (45)	48.44±0.51 (45)
S-25	**NR**	**54.63±0.91 (30)**

* Figures in parenthesis indicate number of observations

Table 35. Production performance of females

Gen.	Egg production (Nos.)	
	40 wks	52 wks
	PB-1	
S-11	53.10±0.67 (251)	86.98±0.94 (240)
S-12	**54.52±0.88 (240)**	**95.02 (237)**
	PB-2	
S-24	53.11±0.84 (127)	88.64±1.40 (123)
S-25	**43.00 (119)**	**104.12 (96)**
	Control	
S-24	57.40±0.78 (32)	100.78±1.58 (32)
S-25	**47.52 (34)**	**99.82 (14)**

* Figures in parenthesis indicate number of observations

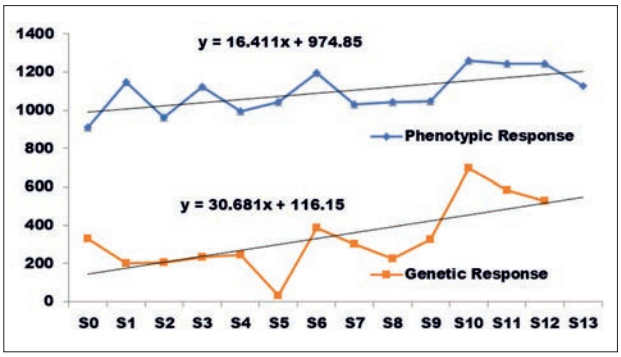


Fig 2. Genetic and phenotypic response to 5 week body weight in PB-1

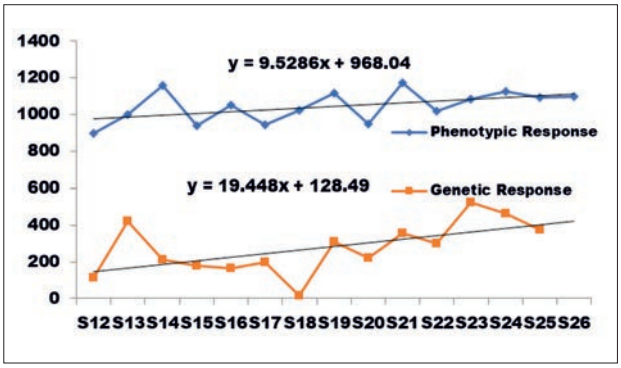


Fig 3. Genetic and phenotypic response to 5 week body weight in PB-2

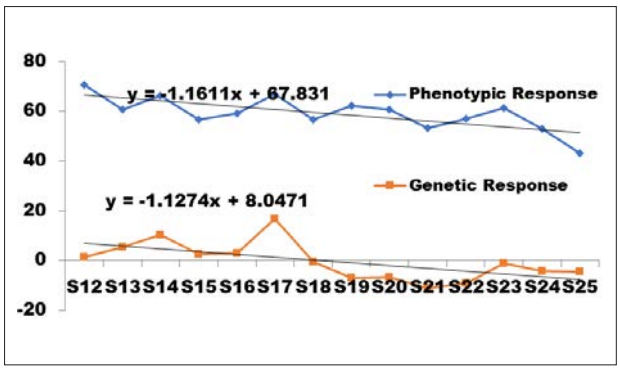


Fig 4. Genetic and phenotypic response of egg production up to 40 wks in PB-1

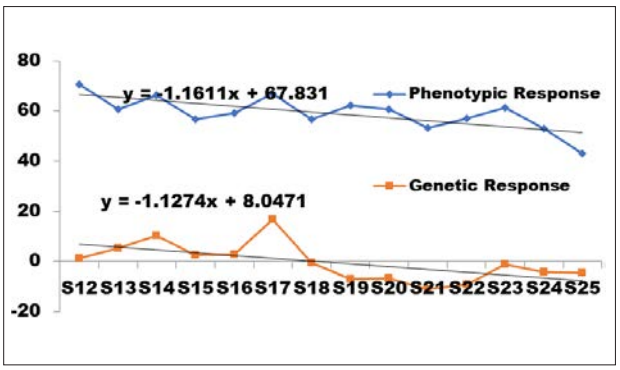


Fig 5. Genetic and phenotypic response of egg production up to 40 wks in PB-2

Field Evaluation of PB-1 X PB-2 Cross

PB-1 x PB-2 cross (Raja –II) was evaluated under field condition. A total of 200 Raja II chicks were reared under intensive management. The body weight at 6 and 7 weeks was 1450 and 1890 g with 2.14 FCR (up to 7 weeks) and 97 % survivability. The farmer got a net profit of Rs. 4888/ 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	:	1.45 kg
Average 7th week body weight	:	1.89 kg
FCR	:	2.14
Survivability	:	97.00%

1. Expenditure

Cost of chick 200 X Rs.16	=	3,200.00
Cost of feed (approx) up to 6 weeks 194 birds X 3.10kg feed X Rs.30	=	18,042.00
Other expenditure		
200 birds X Rs.10	=	2,000.00
Total Expenditure	=	23,242.00

2. Income

194 birds X 1.45kg X Rs.100	=	Rs.28,130.00
Profit (approx) 28,130- 23,242	=	Rs 4,888.00

Activities undertaken under DAPSC/SCSP

A total of 1440 eighth week old chicks were distributed to 140 Scheduled caste farmers and landless labourers of different villages Mulabagilu taluk of Kolar district. Each farmer was distributed with 10-12 chicks, a waterer, a feeder and 10 kgs of feed.

Germplasm supply

A total of 1,71,482 Nos. germplasm (1,57,113 day old chicks and 14,369 hatching eggs) were supplied to farmers and other stakeholders (288 farmers) during the current year.

Revenue generation

During the year 2020-21, the centre generated revenue of Rs. 49.69 lakhs which was 158% of expenditure on feed cost (Rs. 31.36 lakhs).

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

Activities assigned

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

Action taken

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

Achievements

Collection, conservation and evaluation of native germplasm

A total of 1885 fertile eggs of *Punjab Brown* were set for hatching in S-5 generation. S-5 genetation was were reproduced utilising 50 sires and 150 dams The percent fertility was 94.46%. The hatchability percent on TES and FES were 96.13 and 90.93, respectively. The body weight of *Punjab Brown* chicks at 4 and 8 weeks of age were 498.8, 721.6 g in males and 437.7, 677.5 g in females, respectively (Table 36). The mortality percent in native chicken in different age groups of 0-8, 9-20, 21-40 were 4.44, 3.04 and 1.71, respectively. ASM of *Punjab Brown* was 171.34 days and egg production up to 36 weeks was 52.35 eggs. Egg weight at 36 weeks of age was 49.21 g. Egg production up to 52 weeks of age was 99.26 eggs.

Field evaluation of dual cross (PB-2 x Native) was completed. The body weight of cross at 4, 8 and 20 weeks of age were 468.2, 838.9 and 1794 g, respectively. The mortality percent in dual purpose cross in different age groups of 0-8, 9-20, 21-40 were 3.87, 2.14 and 1.46,

Table 36. Comparative performance of *Punjab Brown* (S-5) and its cross with PB-2

Traits	*Punjab Brown* (Male)		*Punjab Brown* (Female)		PB2 (M) x *Punjab Brown* (F) in Field	
	N	Mean ± SE	N	Mean ± SE	N	Mean
Body weight (g)						
4 wks	79	498.8±9.12	216	437.7±5.77	150	468.2
8 wks	79	721.6±17.99	216	677.5±8.78	132	838.9
16 wks	79	1535±17.06	216	1404±9.99	125	1794
20 wks	79	2126±18.73	216	1789±12.11	125	2046
40 wks	79	3022±11.35	204	2588±18.69	110	2876*
52 wks	54	3693±21.73	172	3102±25.83		
FCR (0-8 wks)			3.9 (M+F)			3.5
ASM (d)			216	171.34±0.54	39	176
EW at 40 wks (g)			110	49.21±1.67	27	52.13
EP 40 wks (Nos)			200	52.35±1.28	27	60.63
EP 52 wks (Nos)			200	99.26±2.27		171

* BW at 40 wks

Table 37. Summary of selection records in last two generations in PB-1 and PB-2

Parameters	PB-1		PB-2	
	S-11	S-12	S-43	S-44
Sires	70	70	70	60
Dams	350	350	350	300
Sires contributed	70	70	70	60
Dams contributed	350	350	350	300
Effective number	233.3	233.33	233.33	200.00
Rate of inbreeding	0.0021	0.0021	0.0021	0.0025
Average Expected selection differential	326.6	128.63	205.6	27.05
Expected response	39.19	21.87	24.67	6.11

respectively in farm. ASM and egg production up to 36 weeks in was 176 days and 60.63 eggs, respectively.

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 37. The PB-1 and PB-2 populations were reproduced utilizing 70 sires and 350 dams during S-13 and 60 sires and 300 dams during S-45 generations, respectively. There is reduction in the selection differential during this generation compared to previous generation in both the lines.

Incubation Records

During the current generation, a total of 3475, 2798 and 310 good chicks were hatched in PB-1, PB-2 and Control populations, respectively (Table 38). The fertility was 94.65, 94.75 and 96.48 % in PB-1, PB-2 and control lines. The hatchability on total eggs set was 95.41, 92.94 and 94.83% in PB-1, PB-2 and control lines, respectively. The fertility and hatchability improved in all three lines as compared to last generation.

Table 38. Incubation records for PB-1, PB-2 and control line

Gen./ year	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
PB-1					
S-12	3649	89.01	3021	83.17	93.44
S-13	**3848**	**94.65**	**3469**	**95.41**	**90.31**
PB-2					
S-44	2625	92.27	2219	87.35	94.67
S-45	**3183**	**94.75**	**2798**	**92.94**	**88.06**
Control					
2019-20	490	83.67	317	72.65	86.83
2020-21	**341**	**96.48**	**310**	**94.83**	**91.50**

Table 39. 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-12	5.33	5.06	5.33
S-13	**4.73**	**4.93**	**3.12**
PB-2			
S-44	5.72	4.20	3.64
S-45	**5.49**	**4.81**	**3.36**
Control			
2019-20	4.42	4.29	2.24
2020-21	**4.52**	**3.40**	**2.74**

Mortality

The mortality reported in PB-1, PB-2 and control lines were 4.73, 5.49 and 4.52%, respectively during 0-5 week (Table 39). During grower period mortality of 4.93, 4.81 and 3.40% was recorded in PB-1, PB-2 and control, respectively. Mortality slightly decreased across all age groups in PB-1 line.

Body weight

During current generation the average body weight at 5 weeks of age was 1202, 1000 and 921.6 g in PB-1, PB-2 and Control lines, respectively (Table 40). The feed efficiency up to 5 weeks of age slightly improved in all the three lines over last generation. The body weight at 5 weeks of age increased in all PB-1 and control lines and decreased in PB-2 line as compared to previous generation.

Table 40. Body weight (g) and feed efficiency at 5 weeks during last two generations

Gen./year	BW 5 wks	Feed efficiency (upto 5 wks)
PB-1		
S-12	1125±3.59 (2860)	1.95
S-13	**1202±4.13 (1480)**	**1.87**
PB-2		
S-44	1049±7.49 (1796)	1.93
S-45	**1000±9.98 (1306)**	**1.89**
Control		
2019-20	774.8±9.98 (221)	1.97
2020-21	**921.6±7.76 (251)**	**1.91**

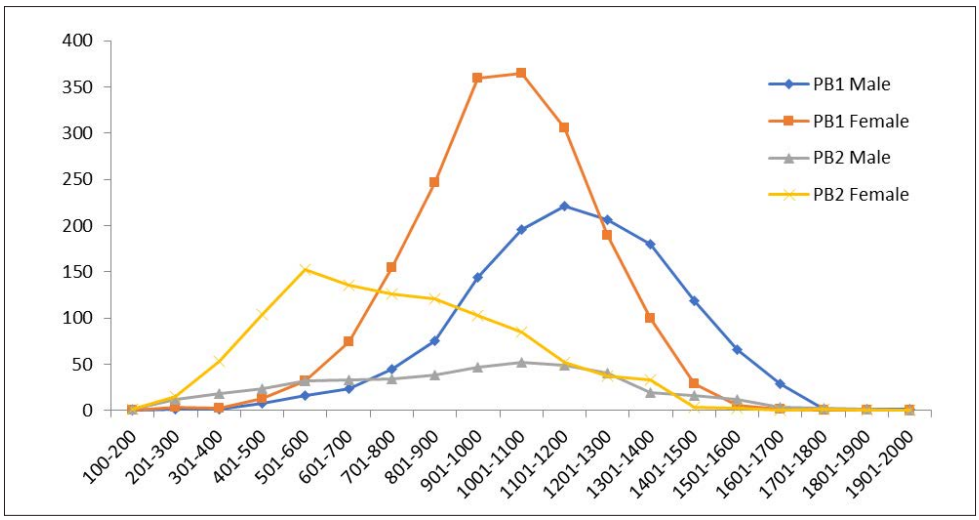


Fig. 6. Frequency distribution of BW 5 wks in PB-1 male and female lines and PB-2 male and female lines.

Frequency distribution of 5 week body weight

Frequency distribution of 5 week body weight (frequency on Y axis and body weight on X axis) (Fig 6). In PB-1 the body at 5 weeks ranged from 200 to 1900 g. Similarly in PB-2 range was from 100 to 1700 g.

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 41) 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.

The age at sexual maturity decreased in PB-1 and slightly increased in PB-2 and control lines as compared to previous generation (Table 42). The egg weight at 40 weeks of age were recorded as 54.41, 54.03 and 52.69 g, respectively in PB-1, PB-2 and control lines. Egg weight at 52 weeks slightly deceased on in PB-1 line. There was decline in the egg production up to 40 weeks of age in PB-1, PB-2 and control lines as compared to last generation (Table 43), however, the egg production revived and maintained similar to the last generation at 52 weeks of age in PB-1 and control lines and increased by 4.4 eggs in PB-2 lines.

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 44.

Genetic parameters

The heritability estimates for five week body weight and 40 week egg production was 0.17 and 0.15 based on the half sib analysis. The heritability of different traits in PB-2 line is low in magnitude.

Table 41. Adult body weight in PB-2, PB-1 and control lines

Gen./ year	Body weight (g)	
	20 wks	40 wks
PB-1		
S-12	2331±10.22 (1142)	2956±17.16 (925)
S-13	**2357±12.94 (471)**	**3065±10.86 (397)**
PB-2		
S-44	2280±11.63 (358)	2879±16.28 (324)
S-45	**2287±27.96 (375)**	**2974±28.18 (351)**
Control		
2019-20	2110±38.28 (88)	2982±42.12 (82)
2020-21	**2193±18.28 (151)**	**2903±17.10 (136)**

Table 42. ASM and egg weights performance at different ages

Gen./ year	ASM (d)	Egg weight (g)	
		36 wks	52 wks
PB-1			
S-12	184.35±0.46 (1080)	55.40±0.15 (811)*	64.08±0.26 (231)
S-13	**179.21±0.46 (465)**	**54.41±0.34 (310)**	**63.12±0.27 (222)**
PB-2			
S-44	169.63±1.59 (358)	52.10±0.31 (162)*	64.01±0.26 (145)
S-45	**170.26±2.26 (361)**	**54.03±2.23 (176)**	**63.98±11.67 (137)**
Control			
2019-20	176.0±9.03 (74)	52.41 ±0.49 (46)*	60.01±0.32 (41)
2020-21	**178.35±28.01 (157)**	**52.69 ±1.39 (125)**	**61.34±0.65 (110)**

Table 43. Egg production performance at 40 and 52 weeks of age

Gen./ year	Egg Production (Nos.)	
	40 wks	52wks
	PB-1	
S-12	59.38±0.58 (834)	112.12±0.45 (371)
S-13	**53.27±0.49 (420)**	**111±0.73 (369)**
	PB-2	
S-44	57.39±1.61 (358)	113.37±1.01 (289)
S-45	**55.27±4.56 (349)**	**117.81±17.16 (298)**
	Control	
2019-20	58.65±1.81 (55)	95.87±2.79 (51)
2020-21	**50.12±5.23 (136)**	**98.16±4.51 (135)**

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 -3.84 and 6.10 g for 5 week body weight and -1.89 eggs and 0.07 eggs for 40 week egg production, respectively in PB-2 population

Table 44. Egg quality traits at 36 weeks of age (n=30)

Egg quality traits	Strains		
	PB-1	PB-2	Control
Egg weight (g)	54.30±0.13	53.12±0.27	52.26±0.35
Egg length (cm)	5.56±0.10	5.52±0.14	5.51±0.07
Egg width (cm)	4.31±0.05	4.27±0.06	4.16±0.05
Shape Index	77.51±0.59	77.36±0.57	75.49±0.43
Shell thickness (mm)	38.37±0.21	37.47±0.54	37.26 ±0.61
Albumen height (mm)	8.07±0.34	8.05±0.34	7.99±0.11
Yolk height (mm)	16.59±0.14	16.54±0.27	16.45±0.17
Yolk diameter (mm)	3.89±0.12	3.85±0.09	3.91±0.17
Yolk index	4.26	4.29	4.21
Haugh unit	91.47	91.68	91.60

* Figures in parenthesis indicate number of observations

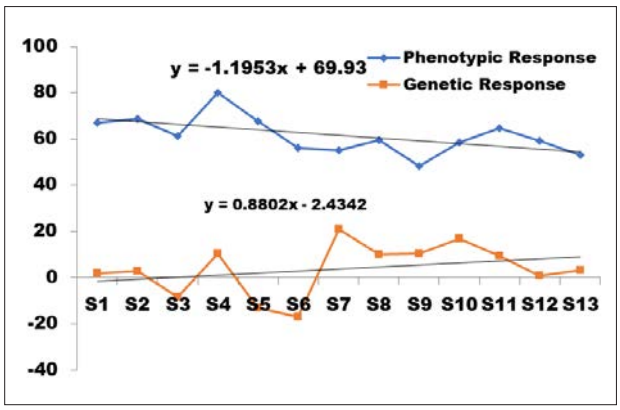


Fig. 7 Genetic and phenotypic response to 5 week body weight in PB-1 at Ludhiana

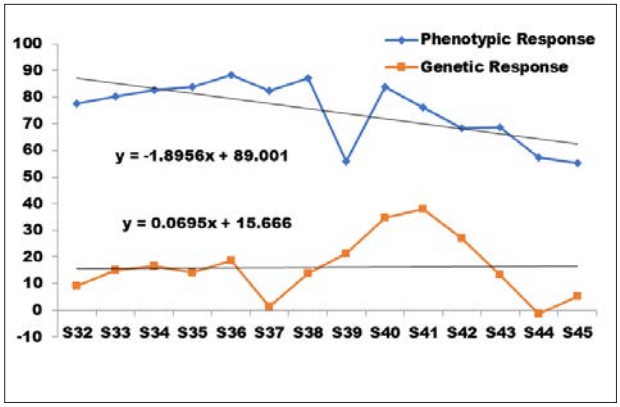


Fig. 8. Genetic and phenotypic response to 5 week body weight in PB-2 at Ludhiana

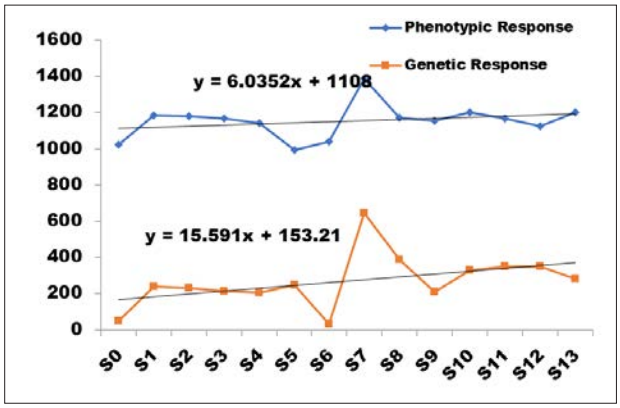


Fig. 9. Genetic and phenotypic response to EP 40 wks in PB-1 at Ludhiana

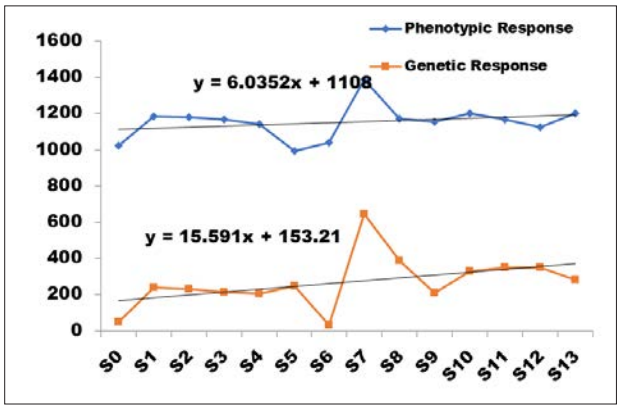


Fig. 10. Genetic and phenotypic response to EP 40 wks in PB-2 at Ludhiana

over last 14 generations. The phenotypic and genetic response for 5 week body weight was6.03 and 15.59 g, respectively in PB-1 over last 14 generations. The phenotypic response of egg production up to 40 weeks of age was -1.19 eggs and genetic response was 0.88 egg over 13 generations.

Evaluation of IBL-80

A total of 90 day old chicks of IBL-80 (PB-1x PB-2) birds were reared on intensive farming with full feeding up to five weeks of age at a farmer's farm. The farmer earned a net profit of Rs. 29.78 per bird.

Average body weight per bird (g)	:	1,601
Total feed consumed per bird (g)	:	3,010
Cost of feed @ Rs.25 per Kg	:	90.32
Receipts (sold at Rs.75/kg live wt.	:	120.08
Profit per bird (Rs.)	:	29.78

Activities undertaken under DAP-SC/SCSP

A total of 74 SC beneficiaries were identified and provided with with 4-weeks old. Several beneficiaries have sold the birds at 500 to 600 rupees after rearing them for 5 to 8 weeks at their back yard. The SC beneficiaries have reported that the scheme has helped them for additional income in the trying times of COVID lockdown and curfew.

Germplasm Supply

A total of 84,279 Nos. germplasm were distributed to 367 farmers.

Revenue generation

During the year 2020-21, the centre generated revenue of Rs. 24.42 lakhs which was 122 % of expenditure on feed (Rs. 20.00 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 for development of broiler sire and dam lines, respectively.
- To maintain a control population simultaneously to measure the genetic trends.

Action taken

- The S-5 generation of the native chicks was reproduced and the body weights at different age were recorded.
- During the year the centre evaluated CSML and CSFL populations upto 52 wks of age in S-18 generation.
- Performance evaluation of crosses.

Achievements

Collection, conservation and evaluation of native germplasm

During the year, S-5 generation of the native chicks was evaluated for growth and confirmatory traits up to 12 weeks of age. A total of 1348 good chicks were hatched in S-5 generation with fertility, hatchability on TES and on FES of 86.50, 77.47 and 89.61%, respectively and improved compared to previous generation.

The process of developing dual purpose cross continued. Farm evaluation of CSML X Desi cross shows encouraging results (Table 45). Average age of sexual maturity was 150 days. Egg production was recorded up to 68 weeks of age. The average egg production at 40, 48, 60 and 68 weeks was 29.23±2.64, 68.09±4.79, 122.18±4.61 and 153.92±6.57 eggs respectively (Table 46).

Table 46. Production performance of dual cross

Trait		CSML X Desi
ASM, days		150
Egg Production (Nos)		
	40 wks	29.23±2.64
	48 wks	68.09±4.79
	60 wks	122.18±4.61
	68 wks	153.92±6.57

Conservation and utilization of elite germplasm

The regeneration of S-18 completed and performance was evaluated in CSML and CSFL.

Incubation information

A total of 3094, 2953 and 1342 eggs were set in CSML, CSFL and control lines and out of which 1490, 1547 and 775 good chicks were produced in respective lines. Fertility percentages were 69.29, 66 and 74.44 in CSML, CSFL and control lines, respectively. Hatchability percentages on TES and FES basis in CSML, CSFL and control lines were 85.23, and 72.15, 78.68 and 88.95 and 57.68 and 77.48 respectively.

Body weights

The body weight at 5 weeks of age and FCR for CSML,

and CSFL lines over last two generations is presented

Table 47. Incubation records for CSML, CSFL and control lines

Line	Eggs set (Nos.)	Fertility (%)	Good chicks (Nos.)	Hatchability (%)	
				TES	FES
CSML	3094	69.29	1490	85.23	72.15
CSFL	2953	66.00	1547	78.68	88.95
Control	1342	74.44	775	57.68	77.48

Table 48. Body weight and FCR at 5 weeks during the last two generations

Gen.	5 wks	
	Body weight (g)	FCR
CSML		
S-17	1220±2.78 (2200)	1.80
S-18	**1198±4.07**	**-**
CSFL		
S-17	1208±2.45 (2100)	1.81
S-18	**1012±11.03**	**-**
Control		
S-17	732.6±3.50 (752)	-
S-18	**-**	**-**

Table 49. Production performance of females in last two generations

Gen.	40 wks E.wt (g)			40 wks HHEP (Nos.)		
	CSML	CSFL	Control	CSML	CSFL	Control
S-17	64.96±1.1	67.19±0.83	-	68.6	68.30	-
S-18	**-**	**59 to 62**	**-**	**-**	**59 to 64**	**-**

in Table 48. The body weight in both CSML and CSFL were decreased in the present generation compared to previous. Performance of control lines was not given.

Production traits

Body weight of adult birds in CSML, CSFL and control lines were not reported by the centre. In CSFL the age at sexual maturity ranged between 155 to 168 days. ASM of CSML and control lines were not reported. The 40 week egg production in CSML ranged between 59 to 64 eggs. Egg weight at 40 weeks of age ranged between 59 to 62 g in CSFL (Table 49). Detailed production performance of CSML, CSFL and control lines are not reported.

Germplasm supply

A total of 23,398 germplasm (14,108 day old chicks, 8,480 fertile eggs and 810 grownup birds) was supplied to the 36 beneficiaries of farmers and other stakeholders during the current year. A total of 1640 birds were supplied to CARI and IVRI.

Odisha University of Agriculture and Technology, Bhubaneswar (Odisha)

Activities assigned

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

Action taken

- Procurement of Native *Hansli* chicken population from its native tract.
- Sentinel rearing of broiler chicks.

Achievements

- De-sealing of the Poultry Breeding and Research Farm (19.09.2020)
- Sentinel rearing of broiler chicks was initiated from 24.11.2020.
- Negative (-ve) report with respect to Avian Influenza was received on dt.5.01.21.
- Procurement of Native *Hansli* chicken population from its native tract.

Germplasm supply

This centre supplied a total of 100 germplasm to a farmer.

Revenue generation

During the year 2020-21, the centre generated revenue of Rs. 8,295.

ICAR Research Complex for NEH Region, Agartala (Tripura)

Activity assigned

- Collection and evaluation of the local native chicken.
- Procurement and evaluation of improved chicken germplasm in the local climatic conditions.
- Production and evaluation of cross of local native 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

- The centre evaluated *Tripura black*, *Dahlem Red*, Coloured broiler dam line (CSFL), BN cross and BND cross during the present year.
- Three way cross was evaluated in E-4 generation up to 72 weeks of age.
- Performance of dual variety chicken (BND cross) was evaluated at farm as well as the farmer's field's conditions.

Achievements

During the period under report, the centre hatched 11,364 good chicks of *Tripura black* and evaluated up to 52 weeks of age. The body weight at 40 weeks was 1540, 1732, 3169 and 1820g in *Tripura Black*, *Dahlem Red*, coloured broiler dam line and BN cross, respectively. E-4 evaluation of BND cross, the 72 week egg production was 170.13 and 142.13 eggs under farm and field conditions, respectively. E-5 evaluation of BND cross was completed upto the 40 week of age at farm and 20 wks of age at field condition. During E-5 evaluation of BND cross, the 40 week egg production was 69.32 under farm condition.

Table 50. Summary of incubation and hatching of different populations

Strains	Year	Eggs set (Nos.)	Fertile eggs (Nos.)	Fertility (%)	Hatchability (%)		Good Chicks hatched (Nos.)
					TES	FES	
Tripura Black	2017-18	6915	-	74.95	59.49	79.37	4114
	2018-19	17514	-	75.98	62.54	82.31	10954
	2019-20	15889	12560	79.05	65.47	82.82	10402
	2020-21	**15718**	**13346**	**84.91**	**72.30**	**85.15**	**11364**
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**
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**
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**
BND cross	2017-18	12486	-	76.31	59.77	78.31	7463
	2018-19	14870	-	77.37	61.72	79.77	9179
	2019-20	33937	27532	81.13	64.65	81.61	22469
	2020-21	**26038**	**21940**	**84.26**	**66.79**	**79.27**	**17392**

Incubation and hatching

A total of 36507 chicks of different varieties / lines of chicken were produced. The overall average percent fertility was estimated 84.01 % in different breeds/ varieties/ lines of chicken. The percent fertility ranged from 77.99 to 87.50%. The fertility improved in populations as compared to previous generations. The overall percent hatchability on fertile egg set (FES) and total egg set (TES) were estimated; 80.19% and 67.37%, respectively. The hatchability on total eggs set (51.84 to 72.30%) improved in *Tripura black*, CFSL cross, BN and BND cross populations as compared to previous generations except in *Dahlem red*. The hatchability on fertile egg set (66.47 to 85.15) also improved in *Tripura black* and CSFL cross populations as compared to previous generation except in *Dahlem red*, BN and BND cross. The highest hatchability on fertile egg set (FES) and total eggs set (TES) was found 85.15% and 72.30% in *Tripura Black*. The lowest hatchability on fertile egg set (FES) and total egg set (TES) was found 66.47% and 51.84% in *Dahlem red* (Table 50).

Mortality

The mortality during brooding period was lowest in *Tripura black* (1.68%) and highest in BND Cross (6.39%). Mortality during growing period ranged from 2.16 – 19.06% and during laying period (21-40 wks) it ranged from 0.00-4.72% (Table 51).

Performance of pure line

The performance of Native and Coloured broiler populations were evaluated upto 52 wk of age and *Dahlem Red* upto 40 wks of age. The body weight of female at 40 weeks was 1317, 1464 and 2801 g in *Tripura Black*, *Dahlem Red*, and Coloured broiler dam line respectively which was more than *Tripura black*, less than *Dahlem red* and almost similar to Coloured broiler of previous generation. The pooled body weight at 40 weeks was 1540, 1732 and 3169g in *Tripura Black*, *Dahlem Red* and Coloured broiler dam line respectively which was more than *Tripura black*, less than *Dahlem red* and Coloured broiler of previous generation. ASM was more in *Tripura black* and *Dahlem red* and Coloured broiler as compared to previous generation. The egg production up to 40 and 52 weeks of age increased in native chicken and Coloured broiler. The average egg weight (40 week) was 46.17, 56.50 and 64.70 g in *Tripura black*, *Dahlem Red* and Coloured broiler population. The egg weight for all pure lines showed improvement to previous generation (Table 52).

Performance of BN cross

The performance of BN cross population was evaluated upto 52 wk of age. The body weight at 20 weeks was 1564.61 g almost equal to previous generation and body weight at 40 weeks was reduced as compared to previous generation. The egg production up to 40 and 52 weeks of age showed increase in comparison to previous generation. The egg weight (40 week) was 48.35g almost similar to previous generation (Table 53).

Table 51. Mortality (%) at different ages in different populations

Strains	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	**1.68**	**5.78**	**1.52**	**4.72**
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	**6.20**	**6.95**	**1.57**	**1.76**
CSFL	2018-19	3.88	18.11	1.99	2.23
	2019-20	4.60	8.30	2.35	2.90
	2020-21	**2.09**	**2.16**	**0.71**	**0.00**
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	**3.26**	**19.06**	**0.82**	**1.77**
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	**6.39**	**5.86**	**0.09**	**1.61**

Table 52. Performance of different pure lines

Traits	N	*Tripura Black*		N	*Dahlem Red*		N	Coloured Broiler Dam line (CSFL)	
		2020-21	2019-20		2020-21	2019-20		2020-21	2019-20
Body weight (g)									
Day old	592	**30.59±0.01**	31.40±0.66	223	**37.24±0.19**	34.64±0.47	63	**42.76±0.48**	44.98±0.38
4 wks	309	**130±0.11**	150±3.63	191	**140.50±2.0**	210.38±6.85	56	**321.7±10.49**	418±10.19
8 wks	219	**287±4.6**	306±7.87	162	**340.86±5.2**	495.0±17.39	54	**703.2±19.42**	1102±36.4
12 wks	186	**556±10.7**	533±14.24	152	**616.61±6.59**	952.8±29.19	52	**1404±40.94**	1722±38.47
20 wks, F	65	**983±23.53**	1027±23.24	74	**1109±18.35**	1432±46.48	23	**2779±39.44**	2451±69.26
20 wks, Pooled sex	127	**1114±24.4**	1117±29.2	149	**1250±20.08**	1601±51.4	39	**2936±59.49**	2789±74.39
40 wks, F	61	**1318±31.4**	1104±17.27	55	**1464±31.74**	1682±32.44	36	**2801±48.53**	2809±80.3
40 wks, Pooled sex	117	**1540±31.5**	1206±29.15	103	**1732±38.50**	1875±53.46	56	**3169±10.04**	3295±100.2
Age at first egg in the flock, d	65	**154**	142.7	74	**153**	134.1	23	**147**	132.0
ASM, d	63	**181**	171	72	**165**	155.76	23	**179**	166.47
EP 40 wks (Nos)									
HH	104	**49.12**	35.78	42	**71.07**	64.97	42	**64.60**	40.64
HD		**52.74**	36.88		**72.21**	66.12		**64.78**	40.64
Survivors'	96	**53.21**	37.53	40	**74.63**	67.00	41	**66.02**	40.64
EP 52 wks (Nos)									
HH	96	**69.98**	64.74	-	**-**	112.80	41	**80.07**	62.34
HD		**79.30**	67.37	-	**-**	116.44		**85.94**	63.45
Survivors'	91	**79.98**	69.59	-	**-**	120.07	40	**87.85**	65.80
EW 40 wks (g)	70	**46.17±0.63**	42.89±0.41	64	**56.50±0.67**	53.34±0.47	45	**64.70±0.66**	57.25±0.51

Table 53. Performance of BN cross

Traits	*N*	*2020-21*	*2019-20*
Body weight (g)			
Day old	121	33.71 ± 0.23	35.04 ± 0.43
4 wks	85	153 ± 4.08	211.4 ± 7.83
8 wks	66	444 ± 1.55	512.9 ± 19.3
12 wks	64	897 ± 23.42	959 ± 31.1
20 wks, F	28	1452 ± 48.46	1291 ± 34.89
20 wks, Pooled sex	43	1565 ± 39.15	1593 ± 45.3
40 wks, F	21	1632 ± 82.34	1579 ± 41.88
40 wks, Pooled sex	34	1820 ± 60.56	1998 ± 65.22
Age at first egg in the flock, d	28	120	139.68
ASM, d	28	160	167.86
EP 40 wks (Nos.)			
HH	27	47.46	33.49
HD		53.97	34.04
Survivors'	23	55.83	34.74
EP 52 wks (Nos.)			
HH	23	67.67	60.51
HD		86.88	61.96
Survivors'	21	87.00	62.75
EW 40 wks, g	57	48.35±0.45	48.27±0.66

Table 54. Performances of BND cross

Body weight (g)	BND cross (E-5)				BND Cross (E-4)	
	N	Farm	N	Field	Farm	Field
Day old	169	34.071 ± 0.24	-	-	32.21	-
4 wks	160	167.66 ± 3.71	308	157.17 ± 8.96	209.56	198.60
8 wks	155	378.79 ± 7.49	235	353.35 ± 4.80	515.81	435.25
12 wks	146	787.14 ± 14.06	222	536.53 ± 15.79	909.82	784.55
20 wks, Pooled sex	138	1720.22 ± 25.99	152	1363.87 ± 32.45	1605.12	1531.64
40 wks* F	91	1848.97 ± 22.60	-	-	1710.13	1590.45
40 wks, Pooled sex	133	2077.49 ± 34.67	-	-	1964.26	1772.40
Age at first egg (d)	94	138	-	-	132.64	145
ASM (d)	94	163	-	-	162	173
Egg wt at 40 wks (g)	64	49.85 ± 0.43	-	-	50.91	47.40
Egg production (Nos.)						
40 wks	98	69.32	-	-	53.77	42.95
52 wks	-	-	-	-	97.30	85.71
72 wks	-	-	-	-	170.13	142.13

*Females

Performance of Three Way Cross (BND Cross)

In E-4 evaluation of BND cross, the 72 week egg production was 170.1 and 142.1 eggs under farm and field conditions, respectively which is slightly more than previous evaluation. E-5 evaluation of BND cross was completed upto 40 wks of age under farm and upto 20 wks of age at field conditions. During E-5 evaluation of BND cross, the 40 week egg production was 69.32 under farm condition. The body weight recorded at 20 and 40 weeks of age under farm condition, showed slightly increase in comparison to previous (E-4) evaluation. The body weight recorded at 20 weeks of age under field condition, showed reduction in comparison to previous (E-4) evaluation. The age at sexual maturity was almost same to previous evaluation (E-4) at farm. The egg weight for farm was slightly less to previous evaluation (Table 54).

Training programme

A total of ten training programmes on backyard poultry farming for rural farmers were organized at different places of Tripura to improve the skills for augmenting poultry production. A total of 500 rural farmers were trained on all aspects of poultry farming like general care and management, breeds and breeding management, formulation of balance ration using locally available cheap feed ingredients, disease and health management were covered.

Germplasm supply

A total of 31,959 germplasm was supplied to the farmers during the reporting period

Revenue generations

The centre realized overall receipt of Rs. 20.86 lakhs which was 93.75% of the expenditure on feed cost (Rs. 22.25 lakhs).

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 condition for development of cross.
- Evaluation of terminal cross (*Narmadanidhi*) in different agroclimatic conditions

Action taken

- The centre maintained the *Kadaknath*, Jabalpur colour, *Kadaknath* cross populations.
- During the current year, the centre evaluated G-0 generation of *Kadaknath* and Jabalpur colour populations upto 52 weeks of age.
- The G-1 generation of *Kadaknath* and Jabalpur colour was produced and evaluated upto 20 weeks of age
- Performance of *Kadaknath* cross was evaluated.
- The *Narmadanidhi*was evaluated in the field up to 20 weeks of age.

Achievements

Jabalpur centre is working on the development of location specific varieties suitable for rural poultry production. During last week of March 2020, unfortunately project farm suffered from a virulent form of Ranikhet disease in all poultry houses. Thereafter, all farm houses, equipment, hatchery, godown and farm area were thoroughly cleaned, disinfected and non-operational for 3 months to eradicate disease infection completely. After that we procured Jabalpur colour and Kadakanth grower birds (12 week age) from hatchery entrepreneur, whom department assisted to establish hatchery unit and provided Jabalpur colour and *Kadaknath* flock.

The G-0 and G-1 generations of *Kadaknath* and Jabalpur colour populations were evaluated up to 52 weeks and 20 weeks of age, respectively. *Narmadanidhi* (25% *Kadaknath* and 75% Jabalpur colour) birds were evaluated in farm and field up to 20 weeks of age.

Jabalpur colour is a synthetic population, which has been developed from random bred multi-coloured broiler population. *Kadaknath* cross is intermediate population in the production process of *Narmadanidhi* variety. *Kadaknath* cross (50% Jabalpur Colour: 50% *Kadaknath*) is produced in each generation by crossing the selected Jabalpur colour male with the selected *Kadaknath* female. Then the F1 male of *Kadaknath* cross is backcrossed with female of Jabalpur colour to produce *Narmadanidhi* commercial chicks.

Table 55. Summary of selection record of Jabalpur colour and *Kadaknath* (G0) 2020-21

Particulars	*Jabalpur. Col. (G-0)*	*Kadaknath (G-0)*
No. of sires used	26	12
No. of dams used	156	72
No. of sires contributed	26	12
No. of dams contributed	156	72
Effective No.	89.14	41.14
Rate of inbreeding	0.00561	0.0122

Selection records

The G-1 generation of *Kadaknath* and Jabalpur colour were reproduced from G-0 population, utilizing 12 sires and 72 dams of *Kadaknath* and26 sires and 156 dams of Jabalpur colour, respectively. The average effective number and inbreeding coefficient for Jabalpur colour was 89.14 and 0.00561 and for *Kadaknath* they were 41.14 and 0.0122, respectively (Table 55).

Incubation records

The fertility was maintained above 80% in all the populations which were lower than previous year. The hatchability on total eggs set improved in Jabalpur colour, whereas, it decreased in *Kadaknath* and *Kadaknath* cross (Table 56).

Mortality and disease incidence pattern

The percent mortality during brooding period ranged from 5.88 to 6.07% and during growing period it ranged between 1.21 to 3.38% in all the population's. Mortality in *Kadaknath* chicks was lower in comparison to Jabalpur colour and crossbred *Kadaknath* flock. The mortality during grower stage was lower in *Kadaknath* and crossbred *Kadaknath* than previous year and nearly similar in Jabalpur colour population (Table 57).

Table 56. Incubation records of Jabalpur colour, *Kadaknath* and crossbred *Kadaknath*

Breed/ variety/ cross	Gens./Year	Total eggs set (Nos.)	Fertile eggs (Nos.)	Fertility (%)	Total chicks (Nos.)	Hatchability (%)	
						TES	FES
Jabalpur colour	G-9	5628	5046	89.54	3742	66.90	74.87
	G-10	3727	3118	83.66	2057	55.19	65.97
	G-1	4877	4306	88.09	2824	57.80	65.63
Kadaknath	G-9	3929	3419	88.21	2429	64.20	72.53
	G-10	3018	2646	87.54	2080	68.92	78.73
	G-1	1858	1547	83.42	1017	54.73	65.74
Kadaknath cross	2018-19	1258	1138	90.46	1090	86.65	95.78
	2019-20	1428	1250	87.53	917	64.21	73.36
	2020-21	720	596	82.66	430	59.76	66.67

Table 57. Mortality record in Jabalpur colour, *Kadaknath* and crossbred *Kadaknath*

Breed / variety / line	Year	0-5 week	6-20 week	21-40 week
No. of sires used	G-9	6.30	4.54	2.40
Jabalpur colour	G-10	5.27	3.38	4.26
	G-0	-	1.21	5.45
	G-1	**6.01**	**3.37**	**-**
Kadaknath	G-9	5.11	4.12	3.43
	G-10	6.68	4.25	4.11
	G-0	-	2.12	6.66
	G-1	**5.88**	**3.38**	**-**
Kadaknath cross	2018-19	4.41	3.81	3.88
	2019-20	5.08	3.91	3.18
	2020-21	**6.06**	**3.66**	**-**

Performance of pure lines and different crosses under different management systems

Production performance of Jabalpur colour population

A Jabalpur colour grower base population (G-0) was procured from nearby hatchery which was established with the assistance of AICRP on poultry breeding during the previous years. 20 and 40 weeks body weight in the base population (G-0) were lower compared to previous year flock. Though age at maturity was delayed by 4 days but 40 and 52 weeks egg production was nearly similar to previous year flock showed good intensity of laying. Body weight at 20 weeks in replacement flock(G-1generation) was lower than previous year flock. G-1generation pullets matured at 156 days of age. 6th week conformation traits showed some lower measurements than preceding year flock (Table 58).

Production performance of Kadaknath population

Body weights of *Kadaknath* G-0 base population at 12, 20 and 40 weeks of age were lower and average age at sexual maturity was higher than the previous year flock. Egg weight at 28 and 40 weeks of age was higher than previous year flock. Hen day egg production upto 40 weeks was similar to previous year flock whereas 52 weeks hen day production was lowered by 0.9 eggs.Replacement (G-1 generation) population was produced from parent population (G-0 generation). The production performance of *Kadaknath* breed is presented in Table 59.The body weights at 20 weeks in G-1 generation were higher than the G-0 population. G-1generation pullets matured at almost similar age of G-0 population. Conformation traits measured at sixth week were somewhat lower than those of previous generation flock (Table 59).

Productionperformance of Narmadanidhi

Narmadanidhi birds are well adopted to diverse climatic conditions and very popular among the rural farmers as they fetch good profit on rearing for both meat and egg production under semi-intensive and free-range systems. The performance records upto the age of 20 weeks are presented in Table 60.

Table 58. Production performance of Jabalpur colour population

Traits	2019-20		2020-2021			
			G-0 generation (Base population)		G-1 generation	
	N	Mean±SE	N	Mean±SE	N	Mean±SE
Body weight (g)						
6 wks	1730	715.3 ± 9.1	-	-	2695	702.5 ± 7.8
12 wks	-	-	260	1011±14.3		
20 wks	727	1711 ± 21.4	165	1561± 21.5	310	1541 ± 23.8
40 wks	680	2130 ± 17.9	156	1970±20.6		
Age at sexual maturity (days)	727	151± 0.78	165	155±1.10	310	156.0±0.91
Conformation traits						
Shank length (cm)						
M	720	7.71 ± 0.02	62	8.19	1215	7.68 ± 0.03
F	1010	7.18 ± 0.06	198	7.53	1480	7.15 ± 0.05
Keel length (cm)						
M	720	8.43 ± 0.04	62	8.80	1215	8.17 ± 0.04
F	1010	8.02 ± 0.02	198	8.15	1480	7.85 ± 0.02
Breast angle (°)						
M	720	60.8±0.8	62	66	1215	60.5 ± 1.24
F	1010	59.3±1.1	198	62	1480	58.7 ± 1.05
Egg weight (g)						
28 wks	715	49.2 ± 0.23	160	48.7 ± 0.35		
40 wks	680	57.9 ± 0.18	156	55.1 ± 0.32		
EP40 wks (Nos.)						
Hen housed	680	95.5±0.91	156	95.7 ± 1.75		
Hen day	-	96.2±0.95	-	96.5 ± 1.51		
Survivors'	653	98.6 ± 1.23	150	98.5 ± 2.05		
EP52 wks (Nos.)						
Hen housed	680	156.7±0.94	156	154.5 ± 1.7		
Hen day	-	158.1±0.81	-	160.4 ± 1.5		
Survivors'	641	161.4 ± 1.6	147	163.8 ± 1.9		

Table 59. Production performance of *Kadaknath* breed

Traits	2019-20		2020-2021			
			G-0 generation (Base population)		G-1 generation	
	N	Mean±SE	N	Mean±SE	N	Mean±SE
Body weight (g)						
6 wks	1810	430.6 ± 5.8	-	-	900	398.1±7.4
12 wks	-	-	104	635.4±8.4	-	-
20 wks	750	1145±18.6	90	1051±16.4	150	1098±20.6
40 wks	730	1570±24.2	72	1545± 17.5	-	-
Age at sexual maturity (days)	750	166±0.81	90	168±1.06	150	169±0.93
Conformation traits						
Shank length (cm)						
M	815	7.06 ± 0.03	24	7.15±0.04	410	6.95±0.04
F	995	6.17 ± 0.05	80	6.75±0.04	490	6.05±0.04
Keel length (cm)						
M	815	8.16 ± 0.03	24	7.75±0.03	410	7.42±0.03
F	995	7.13 ± 0.02	80	7.35±0.04	490	7.10±0.05
Breast angle (°)						
M	815	56.3 ± 0.07	24	60.0±0.05	410	57.0±0.08
F	995	52.9 ± 0.02	80	56.0±0.04	490	52.7±1.02
Egg weight (g)						
28 weeks	740	40.1±0.05	81	40.7±0.08		
40 weeks	730	47.1 ± 0.03	72	48.3 ± 0.25		
EP40 wks (Nos.)						
Hen housed	730	58.2± 1.22	72	57.3± 2.02		
Hen day	-	62.3± 1.76	-	62.5± 1.85		
Survivors'	701	60.1± 1.03	69	64.7± 1.71		
EP52 wks (Nos.)						
Hen housed	730	90.5±1.05	72	91.2 ± 1.91		
Hen day	-	93.7±1.58	-	92.8 ± 1.62		
Survivors'	685	92.1 ±1.01	67	94.1 ± 1.41		

Table 60. Performance of *Narmadanidhi* under farm and field conditions (2020-21)

Particular	N	Farm	N	Field
Body wt. at 8 weeks (g)				
Male	105	1005±3.01	124	760.6±5.23
Female	162	720.3±3.67	214	625.0±5.87
Body wt. at 20 weeks (g)				
Male	101	1500±2.98	115	1370±4.68
Female	156	1380±3.29	198	1120±4.91
ASM (days)	156	168±1.01	-	-

Germplasm supplied

A total of 2961 chicks were supplied to farmers covering 86 backyard/ Small farmers.

Revenue generation

The centre realized a total receipt of Rs. 6.34 laks (Including advance receipt) which is 29.16% of feed cost (Rs. 21.75 laks).

Assam Agricultural University, Guwahati (Assam)

Activites assigned

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

Action taken

- A total of 796 nos of indigenous grower and adult birds are kept in the farm and their performances are under evaluation.
- The performance of a flock of 160 nos. of PB-2 male procured from the DPR, Hyderabad is also studied.
- A flock of 378 nos. of crossbred (PB-2 x Indigenous) have been maintained in the centre and their performance is studied upto 72 weeks
- The performance of 1040 nos. of *Dahlem Red* birds procured from DPR, Hyderabad is evaluated.
- A flock of 687 nos. of *Kamrupa* have been kept in the centre and their performance is evaluated in the farm and field condition upto 72 weeks.
- Performance of a flock of 458 nos. of *Daothigir* birds procured originally from Kokrajhar district is under evaluation.

Details of the implementation of programme and results achieved

A total of 796 numbers of indigenous growers and adult are kept in the farm and their performances are under evaluation. The performance of a flock of 160 nos. of PB-2 male procured from the DPR, Hyderabad is also studied upto 40 weeks. A flock of 378 nos. of BN crossbred (PB-2 x Indigenous) have been maintained in the centre and their performance is studied. The performance of 1040 nos. of *Dahlem Red* birds procured from DPR, Hyderabad is evaluated upto 72 weeks. A flock of 687 nos.of *Kamrupa* have been kept in the centre and their performance is evaluated in the farm and field condition upto 72 weeks. Performance of a flock of 458 nos. of *Daothigir* birds procured originally from Kokrajhar district is under evaluation.

Incubation records

Summary of incubation records has been presented in Table 61. The average fertility of all the flocks were found to be 88.51%. The hatchability on total eggs set ranged from 55.27 to 84.86 %.

Mortality

The mortality during the current year is presented in Table 62. The mortality during brooding and growing period was below 4.63 % in all the lines. The mortality during laying period was below 3.26.

Performance evaluation of germplasm

The juvenile and production traits in indigenous, PB-2 and *Dahlem Red* are presented in Table 63. The 5 weeks body weight was 160.40 g in indigenous, 1170.40 g in PB-2 and 390.20 g in *Dahlem Red*. The ASM was lowest in *Dahlem Red* (158.70 days) and highest in indigenous (172.80 days). *Dahlem Red* pullet natured by 1.70 days early compared to previous generation. In native population, the egg weight and egg production up to 72 weeks was 41.60 g and 110.80 eggs, respectively. In *Dahlem Red*, egg production improved by 1.1 eggs upto 52 weeks. The juvenile and production traits in *Daothigir*

Table 61. Summary of incubation and hatching

Strain	Year	Eggs set (Nos)	Fertility (%)	Fertility (%)		Good chicks hatched
				TES	FES	
Indigenous	2019-20	718	80.08	65.74	82.08	472
	2020-21	**1280**	**80.63**	**65.86**	**81.69**	**843**
BN cross	2019-20	519	66.67	53.94	80.92	280
	2020-21	**901**	**67.48**	**55.27**	**81.90**	**498**
BND cross	2019-20	30226	90.15	83.32	92.42	25183
	2020-21	**19765**	**90.18**	**84.86**	**94.09**	**16773**
Daothigir	**2020-21**	**451**	**79.60**	**66.96**	**84.12**	**302**

Table 62. Summary of Mortality

Strain	Year	0-5	6-20	21-40	41-52
Native	2019-20	2.32	2.16	1.05	0.97
	2020-21	**2.31**	**2.13**	**1.13**	**1.06**
PB-2	2019-20	2.67	2.05	1.39	1.41
	2020-21	**3.12**	**2.58**	**1.98**	**2.72**
Dahlem Red	2019-20	3.92	2.80	1.48	0.92
	2020-21	**3.94**	**4.50**	**1.46**	**0.95**
BN cross	2019-20	1.94	1.32	0.67	0.51
	2020-21	**1.82**	**1.43**	**2.03**	**0.74**
BND cross	2019-20	3.47	2.58	1.18	0.63
	2020-21	**3.38**	**2.49**	**2.27**	**0.77**
Daothigir	2019-20	-	4.04	3.15	-
	2020-21	**4.63**	**4.16**	**3.26**	**2.62**

Table 63. 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)	500	35.20 ± 2.40	160	46.30 ± 3.90	500	36.90 ± 2.80
Day old	475	160.4 ± 7.20	145	1170 ± 60.30	470	390.2 ± 70.40
5 wks	450	1281 ±110.4	120	2390 ± 170.5	440	1280 ± 120.3
20 wks	430	1750 ± 140.5	90	3310 ± 390.1	410	1860 ± 430.6
FCR up to 5 wks	475	3.13	145	2.82	470	2.66
Conformation traits at 5 wks of age						
Shank length (mm)	475	49.30 ± 2.90	145	76.40 ± 6.10	470	61.50 ± 2.90
Keel length (mm)	475	52.10 ± 4.10	145	88.60 ± 8.20	470	54.30 ± 2.70
Breast Angle (o)	475	57.60 ± 8.10	145	72.90 ± 4.90	470	63.70 ± 2.80
ASM (days)	260	172.80 ± 7.20	-		400	158.70 ± 7.20
Egg wt (g) at						
32 wks	250	36.90 ± 3.10			360	49.70 ± 4.30
40 wks	240	38.10 ± 5.20	-		340	59.50 ± 8.40
52 wks	230	40.90 ± 5.60	-		310	61.30 ± 7.20
72 wks	200	41.60 ± 4.90	-		300	61.90 ± 9.20
EP 40 wks (No.)						
Hen housed	260	40.20	-		400	63.90
Hen day	-	41.80	-		-	65.60
Survivor	230	42.10	-		360	67.10
EP 52 wks (No.)						
Hen housed	260	69.70	-		400	121.30
Hen day	-	70.80	-		-	122.10
Survivor	200	73.90	-		310	123.90
EP 72 wks (No.)						
Hen housed	260	110.80			400	214.70
Hen day	-	112.40			-	216.30
Survivor	180	114.30			290	218.60

Table 64. Juvenile and production performance of two way cross

Traits	BN cross	
	Farm	
	N	Mean ± SE
Body wt (g)		
Day old	400	36.90 ± 5.70
5 wks	370	350.40 ± 30.50
20 wks	340	1870.20 ± 190.60
40 wks	310	2680.50 ± 410.60
FCR up to 5 wks	370	3.10
Conformation traits at 5 week of age		
Shank length (mm)	370	52.30 ± 4.70
Keel length (mm)	370	53.60 ± 6.20
Breast Angle (o)	370	67.50 ± 9.20
ASM (days)	200	166.20 ± 8.20
Egg wt (g)		
32 wks	160	47.10 ± 2.90
40 wks	140	49.70 ± 8.10
52 wks	130	59.50 ± 7.10
72 wks	110	60.30 ± 8.20
EP 40 wks (No.)		
Hen housed	200	40.80
Hen day	-	41.70
Survivor	140	43.90
EP 52 wks (No.)		
Hen housed	200	73.90
Hen day	-	75.20
Survivor	130	77.40
EP 72 wks (No.)		
Hen housed	200	123.20
Hen day	-	125.80
Survivor	100	127.10

Table 65. Juvenile and production performance of three way cross

Traits	*Kamrupa* (BND cross)			
	Field		Farm	
	N	Mean ± SE	N	Mean ± SE
Body Wt (g) at				
Day old	500	38.10 ± 3.20	600	38.10 ± 3.20
5 wks	490	250.40 ± 8.10	580	330.70 ± 45.70
20 wks	470	1090 ± 130.40	550	1410.70 ± 170.40
40 wks	430	1810.3 ± 410.6	530	2360.3 ± 480.6
FCR up to 5 wks	490	-	580	2.65
Conformation traits at 5 week of age				
Shank length (mm)	490	50.60 ± 4.70	580	49.70 ± 5.10
Keel length (mm)	490	54.70 ± 9.10	580	51.30 ± 9.20
Breast Angle (o)	490	52.90 ± 8.10	580	68.60 ± 11.30
ASM (days)	180	170.2 ± 7.5	280	149.4 ± 4.90
Egg weight (g)				
32 wks	240	41.50 ± 2.90	250	51.50 ± 7.10
40 wks	220	42.70 ± 8.20	230	56.90 ± 6.20
52 wks	200	45.10 ± 9.10	220	59.10 ± 7.20
72 wks	170	45.60 ± 8.20	190	59.80 ± 9.20
EP 40 wks (No.)				
Hen housed	180	44.90	280	50.40
Hen day	-	45.80	-	51.90
Survivor	140	47.60	230	54.40
EP 52 wks (No.)				
Hen housed	170	75.10	280	92.10
Hen day	-	76.30	-	94.20
Survivor	130	78.90	210	94.90
EP 72 wks (No.)				
Hen housed	170	123.40	280	154.60
Hen day	-	124.10	-	157.20
Survivor	100	129.40	200	160.30

Table 66. Juvenile and production performance of *Daothigir*

Traits	*Daothigir*	
	N	Mean ± SE
Body Wt (g)		
Day old	300	26.30 ± 1.20
5 wks	260	250.50 ± 3.10
20 wks	240	1080 ± 110
40 wks	220	1730 ± 150
FCR up to 5 wks	260	3.10
Conformation traits at 5 week of age		
Shank length (mm)	260	51.10 ± 0.70
Keel length (mm)	260	55.50 ± 0.80
Breast Angle (o)	260	41.60 ± 0.80
ASM (days)	120	198.40 ± 7.20
Egg weight (g)		
32 wks	110	31.90 ± 4.10
40 wks	100	34.60 ± 3.70
52 wks	90	35.70 ± 3.60
72 wks	80	36.10 ± 3.90
EP 40 wks (No.)		
Hen housed	120	38.30
Hen day	-	39.60
Survivor	100	40.10
EP 52 wks (No.)		
Hen housed	120	65.30
Hen day	-	66.20
Survivor	90	69.40
EP 72 wks (No.)		
Hen housed	120	116.20 ± 5.60
Hen day	-	117.10 ± 6.90
Survivor	70	120.30 ± 7.20

is presented in Table 66. The 20 and 40 weeks body weight was 1080 and 1730 g, respectively. The Age at sexual maturity was 198.40 days. The egg weight and egg production upto 72 weeks was 36.10 g and 116.20 eggs, respectively.

Performance of crosses

The five week body weight was 350.40 g and FCR was 3.10 in BN cross. The age at sexual maturity was 166.20 days and remained almost similar as compared to previous generation. The hen housed egg production up to 72 weeks was 123.2 eggs. Almost all the parameters are same as compared to previous generation.

The *Kamrupa* variety was evaluated up to 72 weeks in farm and field conditions during the current year. The 5 week body weight was 330.7 g and 250.4 g in the farm and field, respectively. The age at sexual maturity was 149.4 days in the farm and 170.2 days in the field. The egg weight at 40 weeks of age was 56.9 and 42.7 g, respectively in farm and field, respectively. The hen housed egg production up to 40 weeks, 52 weeks and 72 weeks of age was 50.40, 92.10 and 154.60 eggs in the farm and corresponding values in the field were 44.90, 75.10 and 123.40 eggs, respectively. The performance of cross was slightly improved over last two generations (Table 65).

Germplasm supply

The centre supplied 40,095 (24,444 hatching eggs and 15,651 chicks/growers of *Kamrupa*) germplasm to farmers.

Revenue generation

The centre realized receipt of Rs. 5.11 lakhs during the financial year which is 33.87% of expenditure on feed cost (Rs.15,11 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.
- The centre will work on development of new varieties suitable for rural poultry in the region utilizing local native germplasm.

Action taken

- The centre evaluated G-7 generation of native population up to 72 weeks of age and G8 up to 72 weeks of age and G9 up to 16 weeks of age.
- The G-7 generation of *Dahlem Red* population was evaluated up to 72 weeks of age and G-8 up to 20 weeks of age.
- Evaluation of *Jharsim* (E-8) up to 72 weeks of age and E9 up to 16 weeks of age.
- Jharsim birds were distributed among the farmers. NGOs/KVKs and other agencies.

Achievements

The centre evaluated G-7 generation up to 72 weeks of age. The G-8 generation was reproduced with 360 chicks 100 chicks evaluated up to 72 weeks and 250 chicks were produced and half sib pedigree was recorded up to 20 weeks of age.

Incubation records

The fertility ranged from 87.50 to 95.83% in native and *Jharsim* respectively (Table-67). The fertility improved in pure line and crosses from the previous year 2019-20. The hatchability total egg set was lower in native 66.81hatchability on total egg set and 76.36% on fertile egg set basis which showed improvement from the previous year all the lines. Care should be taken to improve the hatchability.

Table 68. Mortality percentage at different weeks (%)

Breeds/ strains	Year	0-6 weeks	7-18 weeks	19-40 weeks
Native	**2020-21**	**4.96**	**3.06**	**4.75**
	2019-20	5.12	3.15	5.10
Dahlem Red	**2020-21**	**5.10**	**5.11**	**2.71**
	2019-20	5.20	4.52	3.42
PB-2	**2020-21**	**4.15**	**4.13**	**5.23**
	2019-20	4.21	4.48	5.61
PB2 x Desi	**2020-21**	**4.28**	**3.19**	**4.05**
	2019-20	4.20	3.45	3.88
Jharsim	**2020-21**	**5.39**	**5.22**	**4.28**
	2019-20	5.97	5.74	4.42

Mortality

During the current year mortality during brooding period was reduced, it was lower side in current year and ranged from 4.15- 5.39%. Mortality during growing stage was also slightly on higher side ranging from 3.06-5.22%. During laying period mortality was ranged from 2.71 – 5.23%. The centre has to take all the necessary precautions to reduce mortality at all stages in all the lines.

Table 67. Summary of incubation and hatching results for the period

Strain	Year	Eggs	Infertile egg	Fertility (%)	Hatchability (%)		Chicks Hatched (No.)
					TES	FES	
NATIVE	**2020-21**	**6280**	**785**	**87.50**	**66.81**	**76.36**	**4196**
	2019-20	6352	865	86.38	65.38	75.68	4153
Jharsim	**2020-21**	**34655**	**1445**	**95.83**	**83.81**	**87.45**	**29045**
	2019-20	45630	1530	96.64	84.92	87.86	38750

Table 69. Evaluation of Pure line growth and production performance

Traits	Native G 8 N=100	Native G9 N=200	*Dahlem Red* G 6 N= 400	Dahlem Red G 7 N=200	*Dahlem Red* G 8 N=200	PB2 E6 N=100
Body wt (g)						
Day old	-	28.08±0.12	-	-	30.87±0.22	34.23±0.31
4 wks	-	166.33±0.87	-	-	179.86±1.48	513.83±2.13
8 wks	-	365.13±1.41	-		587.58±4.21	1152.36±6.74
12 wks	-	771.59±2.19	-		908.81±4.43	1748.41±11.09
16 wks	-	967.59±2.19	-		1217.17±4.76	2245.21±14.53
20 wks						
M					1722.83±11	3141.64±27.51
F					1528.27±5.37	
ASM (d)	172					
Egg wt (g)						
40 wk	41.48±0.29					
EP. (No.) 40 wks						
HD	30.15					
HH	29.59					
EP. (No.) 52 wks						
HD	67.73					
HH	65.49					
EP. (No.) 64 wks						
HD	103.25			155.10		
HH	99.50			149.59		
EP. (No.) 72 wks						
HD	123.54		202.08	203.55		
HH	119.01		196.69	195.64		

Among three way crosses (*Jharsim*) was evaluated up to 4 weeks of age. The body weight at day old chicks, 4,8, 12, 16 weeks of age for body weight 31.64±0.19, 182.38±0.68, 466.73±4.38, 948.75±3.41, 1444.64±5.70 (g).

Table 70. Evaluation of Pure line growth and production performance

Traits	*Jharsim*			PB2	
	(E7)	(E8)	(E9)	X Native	X Native
Body wt(g)					
day old	-	-	31.64±0.19	-	30.56 ± 0.17
	-	-	182.38±0.68	-	178.81 ± 0.75
8 wks	-	-	466.73±4.38	-	428.47 ± 3.81
12 wks	-	-	948.75±3.41	-	747.41 ± 432
16 wks	-	-	1444.64±5.70	-	1023.10 ± 4.32
20 wks	-	-	-	-	-
M					
F					
ASM (d)	-	161		168	
Egg wt (g)					
40 wk	-	44.37 ± 0.18		40.32 ± 0.25	
EP. 40 wks (No.)					
HD		35.49		34.67	
HH	-	35.07		31.20	
EP. 52 wks (No.)					
HD	-	82.17		69.43	
HH		80.58		61.44	
EP. 64 wks (No.)					
HD	74.36	144.02		113.83	
HH	70.65	140.61		109.46	
EP. 72 wks (No.)					
HD	184.70	185.63		139.50	
HH	178.70	180.97		133.65	

Performance evaluation of germplasm

In native population, production traits of G-8 were recorded up to 40, 52, 64 and 72 weeks of age. The egg production of native population G7 was HD 91.51 and HH 82.36 at 72 weeks of age. Native G9 were body weight 28.08±0.12, 166.33±0.87, 365.13±1.41, 771.59±2.19, 967.59±2.19g at day old and 4, 8, 12, 16 weeks of age. The native body weight and egg production showed improvement compared to previous evaluation.

Extension education training programmes arranged during the period:

A total 30 farmers from different districts of Jharkhand have been provided individual training on poultry production and management for 10 days

Germplasm supply

Centre supplied 18472 *Jharsim* chicks among 163 farmers, NGO, KVKs and other agencies. The germplasm supply was less due to lockdown for COVID-19.

Revenue generation

The centre realised a revenue of Rs. 6.13 lakhs during the financial year which was 37.99 of the expenditure on feed cost.

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-10 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 E9 generation.
- *Pratapdhan* (E10) was reproduced and evaluated up to 20 weeks of age.
- 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-11 generation of *Mewari*

Table 71. Summary of incubation and hatching results of different populations

Strain/breed/ cross	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**
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**
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**
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**
Pratapdhan (BNR)	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**

Table 72. Mortality (%) records at different age in different populations

Strain/ breed/ cross	Gen./Year	0-5 wks	6-20 wks	21-40 wks	41- 52 wks
Mewari	G8	5.42	6.90	7.33	4.17
	G9	4.86	7.83	6.91	3.58
	G10	**5.69**	**7.79**	**5.46**	**3.25**
RIR	G8	6.68	8.79	7.38	5.96
	G9	5.79	8.57	6.27	5.22
	G10	**4.90**	**9.31**	**5.51**	**4.25**
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**
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**
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**

Table 73. Growth and production performance of *Mewari* in different generations

Traits	*Mewari* (G-10)		*Mewari* (G-9)	
	N	Mean ± SE	N	Mean ± SE
Body weight, pooled sex (g)				
day old	3250	32.09±0.06	2818	32.13±0.12
8 wks	1022	608.2±2.7	1569	634.1±2.4
16 wks	989	967.4±7.7	1344	974.9±6.6
20 wks*	602	1408±12.7	660	1340±8.7
40 wks*	378	1732±15.6	317	1746±10.5
ASM (d)	182	167.5±0.65	161	165.8±0.49
Egg weight (g)				
28 wks	252	42.09±0.21	716	41.97±0.20
40 wks	228	45.55±0.24	358	46.16±0.17
EP 40 wks (Nos.)				
HH	487	25.99± 0.30	798	35.70
HD	-	37.27		40.70
Survivors'	460	27.52± 0.31	596	47.81
EP 52 wks (Nos.)				
HH	487	47.80± 0.30	798	53.40
HD	-	50.60		68.95
Survivors'	445	52.32± 0.32	497	85.74
EP 72 wks (Nos.)				
HH	-	-	798	76.42
HD	-	-	-	98.29
Survivors'	-	-	387	91.64

*Values for females only from 20 weeks onwards

chicken population as well as RIR, CSFL, BN and BNR populations. The fertility improved in all the populations (except RIR and *Pratapdhan*) as compared to previous generation. However, the hatchability on fertile eggs set decreased in all the populations (except CSFL and *Pratapdhan*) in the present generation as compared to previous generation (Table 71).

Mortality

The incidence of mortality in various populations is presented in Table 72. The mortality was on lower side in purebred populations during juvenile period except in *Mewari* compared to previous year. However, during growing period the mortality increased in all the populations. The mortality during 21 to 40 weeks of age reduced compared to previous year.

Performance evaluation of germplasm

In *Mewari* population the juvenile body weights at 8 weeks slightly decreased during G-10generationand body weight recorded at 16 weeks of age on pooled sex was also slightly decreased as compared to previous generation. The body weight of females at 20 weeks of age has increased as compared to G-9 generation while the corresponding value for 40 weeks decreased (Table 3). The age at sexual maturity has increased as compared to previous (G-9) generation. The hen housed, hen day and survivors' egg production up to 40 and 52 weeks of age decreased as compared to previous generation (Table 73).

Evaluation of *Pratapdhan*

E-9 generation of *Pratapdhan* was evaluated from 28 to 72 weeks of age while E-10 generation was evaluated up to 20 weeks of age (Table 74). The pooled body weights at different ages decreased except second week 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 decreased as compared to previous evaluation.

Germplasm supply

A total of 31,179 germplasm (30,882 live birds and 297 hatching eggs) was supplied during the current year.

Revenue generation

The centre realized a receipt of Rs.7.12 lakhs only during the current financial year, which was 59.13% of the expenditure on feed cost (Rs 12.04 lakhs).

Other activities carried out

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 as under for your perusal and further directives in this regard.

Table 74. Growth and production performance of *Pratapdhan* during different evaluations

Traits	N	E-10	*Pratapdhan*				
			N	E9	N	E8	E7
Body weight (g)							
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	147.69 ± 1.10
4 wks	308	268.5±3.06	381	277.8±2.82	348	355.0 ± 4.15	378.11±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)	-	-	146		132	134	
ASM (d)		-	139	157.6±0.64	151	155.9±0.60	157.6±0.78
Egg weight (g)							
28 wks		-	210	46.44±0.34	352	46.77± 0.30	47.27± 0.27
40 wks		-	208	52.39±0.25	229	52.67± 0.24	52.57±0.21
EP 40 wks (Nos.)							
Hen housed		-	130	50.26± 0.56	149	41.19	52.35
Hen day		-	-	52.3		58.83	62.26
Survivors'		-	121	54.09± 0.47	139	53.04	77.84
EP 52 wks (Nos.)							
Hen housed		-	130	83.25± 0.56	149	71.9	72.3
Hen day		-	-	90.9		96.5	100.4
Survivors'		-	107	101.13± 0.67	112	95.7	152.7
EP 72 wks (Nos.)							
Hen housed		-	130	127.75± 0.59	149	97.6	100.3
Hen day		-	-	158.2		160.0	166.1
Survivors'		-	85	175.45± 0.85	104	139.9	

*Values for females only from 20 weeks onwards

Table 75. Growth performance of BBN (B X BN cross) under field conditions

Body weight (g) Traits	N	Male	N	Female	N	Pooled
Day old	100	32.49±0.27	71	32.32±0.51	171	32.43±0.22
2 wks	98	83.49±1.45	69	83.77±1.80	167	83.61±1.17
4 wks	96	252.3±7.50	68	254.9±4.48	164	253.4±5.63
6 wks	93	419.3±10.4	68	412.4±5.53	161	416.4±8.23
8 wks	91	920.7±18.8	68	896.5±5.58	159	910.64±13.8
12 wks	91	1741±28.7	66	1290±6.77	157	1537±27.1

Table 76. Growth performance of BBN (B X BN cross) under farm conditions

Body weight (g)	N	Male	N	Female	N	Pooled
Day old	95	32.30±0.42	105	32.96±0.39	200	32.14±0.28
2 wks	93	76.44±1.61	103	74.47±1.59	196	75.32±1.13
4 wks	79	193.4±6.70	82	192.6±6.73	161	192.6±4.71
6 wks	64	529.3±15.3	55	509.7±15.9	119	523.2±11.2
8 wks	63	905.6±23.5	52	897.4±32.1	115	901.3±19.2
10 wks	54	1282±32.1	46	1244±30.0	100	1268±22.2
12 wks	52	1859±20.9	44	1453±20.1	96	1665±25.1

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

- Location specific poultry variety *Himsamridhi* suitable for backyard poultry farming in hilly areas and is currently being propagated.
- In native germplasm, G-8 generation was under evaluation, while G-7 generation from previous year completed evaluation up to 72 weeks.
- The *Dahlem Red* population evaluated (G-7) up to 52 weeks of age.
- The *Dahlem Red* X Native (DN) cross birds were produced and evaluated up to 52 weeks of age.
- The chicks of *Himsamridhi* (DND) have been produced and evaluated at farm and field level up to 52 weeks for growth and production parameters.
- *Himsamridhi* (DND) birds from previous year completed evaluation upto 52 weeks at farm and field level.
- The overall % fertility was good (87.14%) and ranged between 86.89% for *Dahlem Red* to 89.74 % for *Himsamridhi*/DND whereas the overall hatchability was 69.11% and 79.33% on TES and FES basis

Achievements

Local germplasm

A total of 8593 Native stock chicks (G8) were produced at hatchery by collecting fertile eggs from farm. Heritability estimate in native population (G7) from sire component for body weight at 8 week, 12 week and 20 week of age were 0.13±0.04, 0.17±0.08 and 0.16±0.05 respectively. From this year egg production records are also collected sire wise.

Improved germplasm

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

Incubation records

The summary of incubation records for various pure lines and crosses is presented in Table 77. The fertility is similar to the previous year and ranged between 84.23% for Native to 89.74% for *Himsamridhi*/DND. Hatchability is also similar to previous year and ranged from 68.50% to 69.70% on TES and 77.56% to 81.32% on FES basis. Over all fertility is good and hatchability needs further improvement.

Mortality

The chick mortality (0-6 wks) ranged from 1.33 to 6.87 % (Table 78) during this year. The mortality during 7-20-week age interval ranged from 3.50 to 7.20%. The grower stage mortality is reduced in comparison to previous year in DR, native and *Himsamridhi*. Mortality during 21-40

Table 77. Summary of incubation and hatching

Strain/ cross	Year	No. of egg set	% Fertility	% Hatchability		No. of good quality chicks
				TES	FES	
Native	2019-20	20724	87.93	68.83	78.28	14266
	2020-21	**12872**	**84.23**	**68.50**	**81.32**	**8818**
Dahlem Red	2019-20	27256	84.41	62.87	74.47	17136
	2020-21	**3297**	**86.90**	**69.70**	**79.06**	**2865**
DN cross	2019-20	5622	89.06	73.14	82.12	4112
	2020-21	**2180**	**87.71**	**69.63**	**79.39**	**1912**
***Himsamridhi* (DND) cross**	2019-20	55374	86.20	67.38	78.16	37312
	2020-21	**63826**	**89.74**	**69.60**	**77.56**	**57277**

Table: 78. Mortality % at different ages (weeks)

Strain/ cross	Year	% Mortality incidence		
		0-6 wks	7-20 wks	21-40 wks
Dahlem Red (DR)	2019-20	3.56	11.36	3.66
	2020-21	**6.87**	**4.14**	**3.11**
Native	2019-20	3.34	7.23	3.61
	2020-21	**1.33**	**4.63**	**3.54**
DN cross	2019-20	4.70	3.08	1.91
	2020-21	**3.44**	**7.20**	**1.80**
DNXD cross / *Himsamridhi*	2019-20	2.68	6.62	---
	2020-21	**2.24**	**3.50**	**1.58**

week period ranged from 1.58 to 3.14%. Mortality % is reduced during growing (0-6 wks) and laying period (21-40 weeks) in all stocks compared to previous year. Non-specific causes like chilling, overcrowding / huddling and killing by rodents are among important causes of mortality. Further the centre is also taking necessary precautions to reduce the mortality in coming times including necessary bio-security measures.

Performance evaluation of germplasm during the current year

The performance of *Dahlem Red* and Native (G-8) was evaluated (Table 79). The 4, 8 and 20 weeks body weights in DR were 227.7±1.60, 540.2±4.7 and 1561±14.2g respectively whereas corresponding weights for Native population was 210.12±2.4, 510.4±24.9 and 1325±10.2g respectively. The average egg weight

Table: 79. Growth and performance of parental stock

Strain/ cross	*Dahlem Red*				Native			
	2020-21 (G7)		2019-20 (G6)		2020-21 (G8)		2019-20 (G7)	
	N	Mean ±SE	N	Mean±SE	N	Mean ±SE	N	Mean ±SE
Body weight (g) : Pooled sex								
day old	1267	35.80±0.13	1306	36.50±0.25	554	30.62±0.25	680	32.50±0.50
4 wks	1230	227.7±1.60	1272	255.35±5.0	546	210.12±2.4	594	189.6±3.9
8 wks	1020	540.2±4.7	1224	608.7±8.8	528	510.4±24.9	580	490.5±20.6
20 wks	892	1561±14.2	580	1580±11.6	517	1325±10.2	390	1350±20.9
40 wks	428	1671±18.3	500	1650±22.5	367	1512±21.2	328	1490±23.8
FCR (0-8 wks)	1000	4.35	1063	3.90	525	4.45	575	4.58
AFE (days)	468	152	525	148	150	155	320	158
ASM (days)	457	168	460	164	144	185	316	182
Egg weight (g) at								
28 wks	200	49.57±0.15	100	49.67±0.34	100	40.20±0.10	100	42.50±0.10
40 wks	150	51.06±0.10	100	52.40±0.16	100	46.05±0.16	100	46.15±0.16
52 wks	100	--	100	55.10±0.11	100	--	100	47.28±0.11
EP 40 wks (Nos)								
HH	468	77.27	580	74.90	144	46.95	160	48.55
HD	440	78.05	550	80.44	142	48.10	155	50.12
Survivors	419	81.57	540	81.96	139	52.05	150	51.78
EP 52wks (Nos)								
HH	Under evaluation		580	115.90	Under evaluation		160	74.25
HD			535	131.27			148	80.16
Survivors			528	133.44			137	87.25
EP 72 wks (Nos)								
HH	Under evaluation		580	171.65	Under evaluation		160	90.20
HD			525	189.63			147	98.10
Survivors			488	204.02			144	100.22

(40 wks) was 51.06±0.10 and 46.05±0.16 in DR and native population respectively. ASM for DR and native population was 168 and 185 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 week was 115.90 and 171.65/hen respectively while corresponding HDEP was 131.27 and 189.63 respectively/hen. The egg weight at 52 weeks was 55.10±0.08 g. Native parents (G-7) continuing evaluation from previous year completed evaluation from 52 -72 weeks during current year. HHEP at 52 and 72 week was 74.25 and 90.20/hen respectively while corresponding HDEP was 90.20 and 98.10/hen respectively. The DN cross completed evaluation up to 52 weeks of age. The 20 week body weight was 1561±14.2 gm, while ASM was 173 days. The HHEP up to 40 and 52 weeks of age were 60.92 and 103.40/hen, respectively and corresponding HDEP up to 40 and 52 weeks were 61.60 and 110.80 respectively. The egg weight at 28, 40 and 52 weeks of age was 49.02±0.10 gm, 50.90±0.15 gm and 52.85±0.10 gm respectively. The performance of DN cross is similar to previous evaluation.

Evaluation of *Himsamridhi*

The DNXD cross (*Himsamridhi*) was evaluated under farm (Table 80) and field conditions (Table 81) for up to 72 weeks in previous and up to 40 weeks of age during present evaluation. 20 week body weight was 1512 g under farm and 1425 g under field conditions. HHEP upto 40 weeks of age was 68.74 and 52.50/hen under farm and field, respectively. *Himsamridhi* stock continuing evaluation from previous year completed evaluation from 52-72 weeks during current year. HDEP upto 52 and 72 weeks was 108.09 and 166.23 /hen respectively under farm conditions while corresponding egg production under field was 85.80 and 148.25 respectively/hen.

Table: 80. Growth and production performance of crosses produced

Traits	DN cross				DND cross (*Himsamridhi*)			
	2020-21		2019-20		2020-21		2019-20*	
	N	Mean ±SE	N	Mean±SE	N	Mean ±SE	N	Mean ±SE
Body weight (g) : Pooled sex								
day old	554	33.80±0.12	460	34.20±0.25	285	34.95±0.15	400	33.70±0.21
4 wks	550	235.10±1.7	446	220.1±5.3	275	209.15±3.20	370	230.18±3.35
8 wks	472	492.8±8.3	435	545.9±15.7	260	550.60±12.60	340	536.20±7.35
20 wks	400	1470±13.9	415	1495±22.4	245	1512.75±16.60	134	1550±20.2
40 wks	90	1535±11.8	160	1602±28.6	120	1620.20±15.20	130	1635±23.8
FCR (0-8wks)	190	4.50	196	4.30	250	4.22	340	4.45
AFE (days)	118	152	155	154	125	152	134	149
ASM (days)	90	173	151	178	125	160	133	162
Egg weight (g)								
28 wks	50	49.02±0.10	100	48.10±0.10	50	47.10±0.15	50	49.56± 0.17
40 wks	50	50.90±0.15	50	50.85±0.15	50	51.29±0.16	50	50.75±0.10
52 wks	50	52.85±0.10	50	53.35±0.08	50		50	54.10±0.15
EP 40 wks (Nos)								
HH	90	60.92	152	62.87	125	71.65	134	68.74
HD	89	61.60	146	65.33	123	72.81	132	69.78
Survivors	87	63.02	141	67.15	120	74.63	130	70.85
EP 52wks (Nos)								
HH	90	103.40	152	109.48			134	103.26
HD	84	110.80	140	115.65	Under evaluation		128	108.09
Survivors	80	116.32	125	118.20			125	110.25
EP 72 wks (Nos)								
HH							134	156.31
HD	Under evaluation		Culled at 63 weeks		Under evaluation		126	166.23
Survivors							118	177.50

*Evaluated from 40 week onwards in 2020-21

Table: 81. Performance of DND (*Himsamridhi*) at farmer's flocks

Traits		*Himsamridhi* (DND)			
		2020-21 (E6)		2019-20 (E5)*	
		N	Mean ±SE	N	Mean±SE
Body weight (g)					
4 wks		525	178.53±4.45	550	225.35±2.18
8 wks		380	418.76±3.63	510	478.30±5.25
20 wks	M	65	1690±24.70	85	1630±10.58
	F	190	1425±18.50	200	1375±23.50
40 wks	M	--	--		--
40 wks	F	150	1518±18.25	160	1560±21.56
ASM (days)		120	215	100	210
Egg weight (g)					
28 wks		100	44.80±0.42	100	49.56± 0.17
40 wks		50	50.46±0.30	100	50.90±0.23
EP 40 wks (No)					
40 wks		150	52.50	580	55.65
52 wks		Under evaluation		500	85.80
72 wks				495	148.25

*Evaluated from 40 week onwards in 2020-21

Trainings

a. Conducted 3-days training programme "Capacity building of tribal farmers for Rural Poultry Farming" at Sangla, Kinnaur

b. Five one day on farm training activities organized for farmers in collaboration with NGOs (RTDC and Himmothan)

Germplasm supply

During the year, the centre supplied 54,119 chicks/ growers of *Himsamridhi*/ DND, Native and other crosses to farmers (582 farm units) including 143 TSP units.

Revenue generation

The centre realised receipts of Rs 12.68 lakhs during the financial year on account of sale of various poultry products (chicks, eggs, culled birds) which is 73.37% of expenditure on feed cost (Rs 17.22 lakhs).

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-15 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 82.

Incubation records

Incubation records of LC-16 generation in layer control population have been presented in Table 83. Fertility, hatchability on total eggs set and hatchability on fertile eggs set respectively were 78, 80 and 62%. Fertility and hatchability decreased in the current generation as compared to previous generation.

Production performance

During the year 2020-21, the birds of LC-15 generation were evaluated up to 72 weeks of age. The performance of control population and their regression value (time trend of control) has been presented in the following Table 84.

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

Gen.	No. of Sires	No. of Dams	Effective population size (Ne)	Rate of 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

Table 83. Incubation records layer control population

Gen.	Fertility (%)	Hatchability (%)	
		FES	TES
LC-7	81.5	89.3	66.2
LC-8	78.5	91.6	71.9
LC-9	85.1	92.3	78.5
LC-10	70.2	84.2	59.1
LC-11	70.9	87.0	61.7
LC-12	62.0	85.0	53.0
LC-13	59.2	80.7	47.8
LC-14	81.0	82.0	68.0
LC-15	80.7	95.3	76.9
LC-16	78.0	79.6	62.1

Table 84. 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
b	**-5.25 NS**	**12.11***	**0.55 NS**	**-0.23 NS**	**1.07 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 and 64 weeks (up to LC-15) showed non-significant change and the control population appears to be stable for all the traits for last eleven generations.

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

During the period G-19 generation of the control broiler was evaluated for juvenile traits and G-17 generation for production traits.

Incubation records

Incubation records of G-19 generation in broiler control population have been presented in Table 85. Percent fertility, percent hatchability on total eggs set and percent hatchability on fertile eggs set respectively were 88.8, 79.7 and 89.8. Fertility was improved in the current generation as compared to previous generation.

Juvenile body weights

Performance of juvenile traits in control broiler population over 19 generation is presented in Table 86. During the current generation body weight at 5weeks and 6weeks respectively were 788 and 1056 g. After six weeks of age 500 female chicks and 150 male chicks representing all the sires and dams were saved and were being maintained under restricted feeding schedule. At the time of housing only 2 males per sire family 2 females per dam family were housed for recording of production traits. The regression estimates of generation mean on generation number for 5 week body weight and 6 week body weight showed non significant changes over generations indicating the stability of the broiler control population for juvenile body weights.

Table 85. Incubation records Broiler control population

Gen.	Fertility (%)	Hatchability (%)	
		FES	TES
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

Production traits

A total of 300 females were maintained till 40 weeks of age to record the traits like age at sexual maturity, body weights at 20 and 40 weeks of age, egg weight at 32 and 40 weeks of age and egg production to 40 weeks

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

Gen.	5 wks	6 wks
G-1	822	1060
G-2	872	1141
G-3	731	995
G-4	897	1195
G-5	907	1106
G-6	672	891
G-7	592	783
G-8	929	1215
G-9	626	964
G-10	578	829
G-11	522	720
G-12	731	1156
G-13	573	993
G-14	520	663
G-15	570	836
G-16	734	951
G-17	740	930
G-18	755	1042
G-19	788	1056
b	**-8.78 NS**	**-8.31 NS**

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

Gen.	BW 20 wks (g)	BW 40 wks (g)	ASM (days)	EWT 32 wks (g)	EWT 40 wks (g)	Egg Prod 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
b	**-22.06***	**-26.07****	**1.14****	**-0.05 NS**	**-0.05 NS**	**-0.27 NS**

of age. The mean for all these traits were presented in Table 87. The hatching eggs of this population were being supplied to the AICRP centers as and when they require for evaluation of their selected lines. The consolidated production performance of broiler control over generations has been presented in the following Table 87. The regression estimates of generation means on generation number (G-0 to G-18) showed non-significant changes over the generations in all egg production and egg weight indicating the stability of the broiler control.

Critical Observations

KVASU, Mannuthy

Accomplishments and achievements

1. This centre has evaluated native chicken, IWN and IWP (Elite layer lines) for growth and production traits.
2. The body weights recorded at 16, 40 and 64 weeks of age was 961, 1504 and 1558g, respectively for IWN and 926, 1437 and 1471g, respectively for IWP strains.
3. The hen-housed egg production up to 64 weeks of age was 262.4 in IWN and 249.6 in IWP strain.
4. IWN X Native (ND) was produced (150 Nos.) and the cross of ND male with RIR female (NDR) have been produced and evaluated in farm condition up to 40 weeks.
5. The centre has supplied 1,22,876 number of germplasms during the year.
6. The centre has generated the revenue of Rs.18.78 as on 31.3.2021, which was 94.32% of the recurring expenditure.

Short fall

1. The egg weights of IWN and IWP strains at 64 weeks are less (about 51.8 g).
2. Mortality in IWN strain during 17-64 weeks of age was higher than the maximum expected level of 1% mortality per month.
3. Egg quality studies as suggested in the technical program is not done.

Suggestions for further improvement

1. Efforts should be made to increase the germplasm supply.
2. Egg quality analysis of layer lines needs to be carried out as given in the technical program.

AAU, Anand

Accomplishments and achievements

1. The S-1 generation of *Ankleshwar* breed was evaluated up to 40 weeks of age.
2. Egg production of *Ankleshwar* breed up to 40 weeks of age during S-1 generation was 76.38.
3. S-1 generation of IWN and IWP strains along with control layer population was evaluated up to 72 weeks of age. Egg production up to 72 weeks of age was higher in IWP (309.79) than IWN strain (307.24).
4. The centre has supplied a total of 55,528 germplasm during the reporting period.
5. The centre has generated the revenue of Rs. 24.91 lakhs during the reporting year which was 59.10% of the total expenditure of feed cost (42.15 lakhs).

Short fall

1. Genetic parameters such as heritability, genetic and phenotypic correlations of various traits of IWN and IWP strains are not provided.
2. Egg quality studies as suggested in the technical program is not done.
3. The germplasm supply is lesser as compared to previous year.

Suggestions for further improvement

1. Efforts should be made to increase the germplasm supply.
2. Genetic parameters and frequency distribution data (egg production) should be presented and discussed in the report.
3. Egg quality analysis of layer lines needs to be carried out as given in the technical program.

KVAFSU, Bengaluru

Accomplishment and achievements

1. Evaluated the performance of native chicken population (S-4), PB-1 (S-13) and PB-2 (S-26) for economic traits.
2. S-5 generation of native chicken was produced. The average body weight of day old and 8 week of native chicken was 28.03 and 384.9 g, respectively
3. Body weights at 5 weeks of age in PB-1 and PB-2 lines were 1126 and 1097 g, respectively.
4. The average phenotypic and genetic response of body weight at 5 week over 13 generations in PB-1 was 16.4 and 30.7 g, respectively. Corresponding values in PB-2 at 5 week over 14 generations was 9.52 and 19.45 g, respectively.
5. PB-1 x PB-2 cross attained 1890 g at 7 weeks of age in field conditions.
6. A total of 1,71,482 germplasm were supplied to 288 beneficiaries.
7. During the year 2020-21, the centre generated revenue of Rs. 49.69 lakhs which is 158% of expenditure on feed cost (Rs.31.36 lakhs).

Shortalls

1. Mortality is higher during grower phase in PB-1 line.
2. There is significant reduction in egg production in PB-2 line.

Suggestions

1. Steps to be taken to reduce the mortality during grower stage in PB-1 line.
2. Egg production performance of native birds may be reported.

GADVASU, Ludhiana

Accomplishment and achievements

1. Evaluated the performance of *Punjab Brown* (S-4), PB-1 (S-13), PB-2 (S-45) and cross (PB-2 X Local) for economic traits.
2. Body weight of *Punjab Brown* at 8 and 16 weeks was 721.6, 1535 and 677.5, 1404 g, respectively in male and female. Egg production up to 52 weeks was 99.26 eggs with egg weight of 52.35 g at 36 weeks of age.
3. PB-2 x Native cross was evaluated for field performance. The body weight at 4, 8 and 20 weeks of age were 468.2, 838.9 and 1794 g, respectively. ASM and egg production up to 36 weeks in was 176 days and 60.63 eggs, respectively.
4. Average body weight at 5 weeks of age was 1202, 1000 and 921.6 g in PB-1, PB-2 and Control lines, respectively.
5. Egg production up to 40 weeks of age in PB-1, PB-2 and Control lines were 53.27, 555.27 and 50.12 eggs, respectively.
6. Genetic response over last 13 generations for 5 week body weight was 15.59 g in PB-1 and 6.10 g in PB-2 population.
7. A total of of 84,279 germplasm were supplied to 367 farmers.
8. During the year 2020-21, the centre generated revenue of Rs. 24.42 lakhs which was 122% of expenditure on feed cost (Rs. 20.00 lakhs).

Shortfalls

1. The body weight of PB-1 and PB-2 lines at 20 weeks of age (Table 41) needs to be maintained between 2150-2200 g for realizing the optimum production during laying phase.

Suggestions

1. Process of developing of a new location specific variety needs to be given top priority.
2. Centre needs to implement and monitor the feed restriction program effectively to maintaining the required body weight at 20 weeks of age.

ICAR-CARI, Izatnagar

Accomplishment and achievements

1. Evaluated the performance of native (S-5), CSML (S-18), CSFL (S-18) and CSML X Desi cross for economic traits.
2. CSML X Desi cross had average age of sexual maturity of 150 days. The average egg production at 40, 48, 60 and 68 weeks was 29.23±2.64, 68.09±4.79, 122.18±4.61 and 153.92±6.57 eggs respectively.
3. Average body weight at 5 weeks of age was 1012 and 1198 g, respectively in CSFL and CSML lines.
4. A total of 23,398 germplasm was supplied to 36 famers and 1,640 birds were supplied to CARI & IVRI.

Shortfalls

1. Growth and egg production performance of native population was not reported.
2. Detailed production performance of CSML, CSFL and control lines are not reported. Selection records and response to selections were not reported.
3. Germplasm supply needs improvement.

Suggestions

1. Efforts should be made to improve the germplasm supply.
2. Top priority to be provided to develop a new location specific variety.
3. Efforts should be made for proper reporting of results in the annual report.

OUAT, Bhubaneswar

Accomplishment and achievements

1. De-sealing of the Poultry Breeding and Research Farm and Sentinel rearing of broiler chicks was initiated from 24.11.2020.
2. Procurement of Native *Hansli* chicken population from its native tract was initiated.

Suggestions

1. Proposed to discontinue the centre from 31.03.2022.

ICAR RC Agartala

Accomplishment and achievements

1. Tripura centre evaluated *Tripura Black*, *Dahlem Red*, broiler dam line and their crosses during the year.
2. The 40-week egg production was 53.77 and 42.95 eggs under farm and field conditions, respectively in BND cross (E4).
3. The body weight at 40 weeks of age was 1964.26 g at farm and 1772.40 g at farmers field respectively.
4. During the period, a total of 31959 chicks were

supplied to 516 farmers of Tripura with a revenue receipt of Rs. 20.86 lakhs.

Shortfalls

1. The centre has to hasten the development of location specific variety.
2. Growing period mortality was higher

Suggestions for further improvement

1. Mortality needs to be reduced during the growing phase.
2. Germplasm supply needs to be improved.
3. The PI is advised to compile the data on 3 way cross and submit it to nodal centre for registering the variety.

NDVSU, Jabalpur

Accomplishments and achievements

1. The centre maintained and evaluated the *Kadaknath*, Jabalpur colour and *Kadaknath* cross populations.
2. During the current year, the centre evaluated the G-0 generation of *Kadaknath* and Jabalpur colour populations up to 52 weeks of age.
3. The G-1 generation of *Kadaknath* and Jabalpur colour was produced and evaluated up to 20 weeks of age
4. The *Narmadanidhi* was evaluated in the field up to 20 weeks of age.
5. A total of 2961 germplasm was supplied.
6. The centre realized a receipt of Rs. 6.34 lakhs during the current financial year which is 29.16% of expenditure on feed cost (Rs. 21.75 lakhs).

Short falls

1. There was liquidation of stock due to severe outbreak of extremely virulent form of Ranikhet disease thereby affecting the progress of the centre as claimed in the report.
2. There was sever/drastic decline both in germplasm supply and revenue generation of the centre

Suggestions for further improvement

1. Strict biosecurity measures and preventive measures such as vaccination, and cleanliness and hygiene must be followed to prevent such drastic measures of liquidation of the stock
2. Efforts should be made to improve the germplasm supply and revenue generation.
3. The standard of reporting of the results of the centre (Annual Report) must be improved.

AAU, Guwahati

Accomplishments and achievements

1. Guwahati centre evaluated native, *Dahlem Red*, PB-2 and BN populations up to 52 weeks of age along with *Daothigir* upto 40 weeks of age
2. The body weight at five weeks was 150.30 g in indigenous, 1180.60 g in PB-2 and 410.30 g in *Dahlem Red*
3. The hen housed egg production upto 52 weeks of age was 91.30 eggs in the farm and 74.80 eggs in the farm in *Kamrupa*.
4. The hen housed egg production upto 40 weeks of age was 18.10 eggs in Daothgiri.
5. The centre supplied 40095 germplasm to 266 farmers with a revenue receipt of Rs. 5.12 lakhs during the year.

Short falls

1. Germplasm supply needs to be improved further.

Suggestions for further improvement

1. Daothgir, native chicken sample size may be increased and the research work may be concentrated on the breed.

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 119 (G8) at 72 weeks of age, which showed improvement compared to previous evaluation.
3. Centre has supplied 18472 *Jharsim* chicks among 163 farmers, NGOs, KVKs and other agencies.
4. The revenue receipt was Rs. 6.13 lakhs.

Short falls

1. The field performance of *Jharsim* not recorded
2. Germplasm supply was very low

Suggestions for further improvement

1. The field 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. The centre needs to improve the overall performance

MPUAT, Udaipur

Accomplishments and achievements

1. G-10 generation of *Mewari* breed was evaluated up to 52 weeks of age.
2. *Pratapdhan* was evaluated for production traits up to 72 weeks of age during E9 generation.
3. *Pratapdhan* (E10) was reproduced and evaluated up to 20 weeks of age.
4. RIR and CSFL populations were regenerated and being maintained at the centre

5. Germplasm of *Pratapdhan*, a dual-purpose variety was supplied to the needy farmers.
6. RIR and CSFL populations were regenerated and being maintained at the centre
7. A total of 31179 germplasm was supplied.
8. The centre realized a receipt of Rs. 7.12 lakhs during the current financial year which is 59.13% of expenditure on feed cost (Rs. 12.04 lakhs).

Short falls

1. The mortality during growing period was higher in all purebred and crossbred populations.
2. Both germplasm supply and revenue generation of the centre was less.
3. Hen housed and hen day egg production up to 40 weeks of age in *Mewari* breed has decreased in G-10 generation as compared to G-9 generation.
4. The performance evaluation of RIR, CSFL and BN cross is missing in the Annual Report submitted by the centre.
5. Number of chicks hatched and number of chicks evaluated at day old of *Mewari* is not matching.

Suggestions for further improvement

1. Efforts should be made to improve the germplasm supply and revenue generation.
2. Efforts should be made to improve the standard of reporting of the results of the centre.

CSKHPKVV, Palampur

Accomplishments and achievements

1. Palampur centre evaluated native germplasm, *Dahlem Red* and *Himsamridhi* during the year.
2. The HDEP at 40 weeks and 52 weeks was 45.95 and 80.16 eggs, respectively in native chicken.
3. The HDEP at 40 weeks and 52 weeks was 53.61 and 92.35 eggs respectively in Himasamridhi.
4. A total of 53679 germplasm was distributed to the 466 farmers of Himachal hill region. An amount of Rs. 15.71 lakhs was generated as revenue.

Suggestions for further improvement

1. The native chicken collected needs to registered with NBAGR, accordingly the data may be collected and submitted to ICAR-DPR.
2. Efforts should be made to further improve the germplasm

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 (Table 1). One non funded centre has also been started during the XII plan.

Table 1.Centres in operation under Poultry Seed Project

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

Table 2. Targets for germplasm supply for different Centres

S.No	Centre	Target (nos.)	Achievement
1	Bihar Animal Sciences University, Patna	50,000	50,495
2	West Bengal University of Animal and Fishery Sciences, Kolkata	1,00,000	--
3	Regional Centre, ICAR Research complex for NEH Region, Jharnapani,	70,000	51,024
4	ICAR-National Organic Farming Research Institute, Gangtok	40,000	69,241
5	Regional Centre, ICAR Research complex for NEH Region, Imphal	60,000	15,080
6	Tamil Nadu Veterinary and Animal Sciences University, Hosur	1,00,000	74,851
7	ICAR-Central Coastal Agricultural Research Institute, Panji, Goa	50,000	35,822
8	ICAR-Central Island Agricultural Research Institute, Port Blair	50,000	4,503
9	PVNR Telangana Veterinary University, Warangal	50,000	33,411
10	Sri Venkateswara Veterinary University, Tirupati	50,000	29,157
11	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	50,000	14,631
12	ICAR Research Complex for NEH Region, Umiam, Barapani	50,000	15,177

Technical program

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

Bihar Animal Sciences University, Patna

Activities assigned

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

Work done

Parent Stock

During the period under report 104 male and 810 female day-old chicks of *Vanaraja* and 118 male and 590 female day-old chicks of *Gramapriya* were procured and reared at the center. The average body weight of the birds at different weeks of age is given in Table 1.

Egg production

A total of 118859 eggs were produced from *Vanaraja* and *Gramapriya* parents during the period. The *Vanaraja* parents attained the average age of first egg lay at 3% egg production at 182 days of age. The average age at 10% egg production of was recorded to be 195 days. *Gramapriya* attained the average age of first egg lay at 3% egg production at 168 days of age. The average age at 10% egg production of was recorded to be 178 days.

Egg weight

Egg weight was recorded at 14 days interval. The average estimates of egg weight of *Vanaraja* and *Gramapriya* are presented in the Table 2.

Fertility and hatchability

A total of 118859 eggs were set in the incubator during the period under report and total 50024-day old chicks were produced. Fertility of *Vanaraja* and *Gramapriya* birds was 73.33% and 50.54%, respectively. Hatchability on TES and FES for *Vanaraja* was 60.35% and 73.56%

Table1. Body weight (g) of parent lines at different weeks of age

	Vanaraja		*Gramapriya*	
Age (wks)	**Male line**	**Female line**	**Male line**	**Female line**
4	373.13±9.89	268.72±8.32	370.32±06.82	254.80±07.32
8	1069.03±29.22	772.83±21.23	1068.02±28.24	578.66±20.25
12	1893.87±44.40	1160.65±19.74	1891.88±46.44	1165.78±22.77
16	2352.83±58.94	1675.84±34.56	2352.72±59.97	1676.86±36.54
20	3114.59±60.92	1772.36±41.27	3115.58±62.90	1770.35±40.26
24	3325.43±75.27	1941.39±44.36	3328.52±74.25	1942.37±43.34
28	3274.67±0.46	2374.46±0.58	3273.76±48.45	2374.57±65.56
32	3499.28±8.59	2482.24±9.13	3498.80±08.77	2484.13±42.12
36	3581.96±26.32	2104.02±27.15	3556.96±26.32	2442.24±29.16
40	3637.9±46.54	2403.42±47.65	3662.09±46.53	2479.42±54.65
44	3739.5±50.12	2426.46±52.42	3642.05±48.09	2489.78±52.40
48	3848.84±49.15	2535.52±55.19	3752.94±49.13	2490.78±55.59
50	3752.58±60.56	2566.58±55.62	3755.76±62.56	2500.10±13.62

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

Age (wks)	*Vanaraja*	Age (wks)	*Gramapriya*
35	51.76±0.23	28	46.64±0.32
37	51.78±0.54	30	46.98±0.40
39	52.24±0.45	32	50.44±0.38
41	53.66±0.34	34	52.16±0.42
43	53.46±0.56	36	52.88±0.48
44	54.74±0.53	38	52.92±0.52
46	54.12±0.42	40	52.98±0.62
48	55.34±0.56	42	53.46±0.39
50	55.36±0.12	44	54.71±0.46
52	55.64±0.38	46	55.09±0.49
-	-	48	55.10±0.55
-	-	50	56.13±0.65

respectively, and for *Gramapriya* was 46.78% and 65.33% respectively during the reporting period.

Germplasm supply and Revenue Generation

A total of 50495 commercial chicks were distributed to 947 farmers. Most of the agency/farmers usually prefer to take grown up chicks after completion of brooding stage preferably at the age of 5-6 weeks. Birds were distributed among the farmers through various agencies like ATMA and KVKs to promote backyard poultry farming in the state. A sum of total Rs. 22,25,426 have been generated as revenue.

Field performance and feedback from beneficiaries

Farmers were rearing the *Vanaraja* and *Gramapriya* birds under intensive, semi intensive and extensive system but it was mostly found in 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 are allowed to maintain under extensive system of rearing. High mortality of chicks up to 3 months of age was great concern as reported by the farmers. Coccidiosis and Common colds are the major problems felt by the farmers. Poultry farming is becoming popular enterprises in this state. The SHG members are selling their eggs through evening egg shop in local market. Due to the larger size and brownish colour of the egg, its demand is very high and they get higher price. Eggs are sold usually at the rate of Rs. 14 – 18 per egg. Birds are sold at the rate of Rs. 250-300 per kg live weight basis. The farmers are increasing their livelihood of the family. The farmers are satisfied on the performance of *Vanaraja* but they are 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

1. Lack of budgetary provision for training and awareness activities
2. Farmers do not prefer to take chicks in winter season
3. 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

Regional Center of ICAR Research Complex, Jharnapani, Nagaland

Activities assigned

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

Work done

Parent Stock

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

Egg production

The HHEP in *Vanaraja* parents at different weeks are presented in Table 4. The egg production was consistent in *Vanaraja* parents.

Hatching performance

The average fertility was 75.63% and hatchability on TES and FES were 51.11% and 66.88% respectively in *Vanaraja* parents.

Germplasm supply and Revenue Generation

During the reporting year altogether 51,024 chicks were supplied to the 631 numbers of beneficiaries including farmers, KVKs, NGOs working in Nagaland and neighboring states and different state/central sponsored program. Several capacity building programs were undertaken to popularize the *Vanaraja* and *Srinidhi* poultry varieties for backyard farming in Nagaland. Under Tribal Sub Plan 52 beneficiaries were covered from Kiphire and Phek districts in Nagaland and altogether 1745 Day Old Chicks and grown up chicks of *Vanaraja* and *Srinidhi* varieties were provided to the beneficiaries. The performance of *Vanaraja* birds under field condition was appraised from the demonstration unit established in previous year and obtained encouraging results. The center has generated revenue of Rs. 30,45,349.

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

Age (wks)	*Vanaraja*
28	45.93
32	61.37
36	47.45
40	52.03
44	49.86
48	45.09
52	27.65
64	25.95
72	36.18

Table 3. Body weight (g) of *Vanaraja* and *Srinidhi* Parant lines

Age (wks)	*Vanaraja* male (batch 13)	*Vanaraja* female (batch 13)	*Srinidhi* male (batch 7)	*Srinidhi* (batch7)
4	285.7±11.05	240.86±7.79	326.75±8.46	207±3.61
6	550±12.09	366.8±12.33	399.75±14.21	270.16±5.99
8	722.2±21.12	579.23±17.65	632.75±25.54	346.33±9.91
12	1198±42.36	1135.13±25.30	1179.4±22.61	625.5±15.43
16	1695.75±42.44	1429.76±42.00	1930.05±37.42	937.83±21.52
20	1755.55±57.43	1709.26±40.92	26.28.5±74.08	1143.33±28.03

Table 5. Chicks supplied, adult birds culled, egg sold and revenue generated during 2020-21

Month	Chicks supplied (nos.)	Adult bird culled (nos.)	Egg sold (nos.)	Total Revenue (Rupees)
April, 2020	0			0.00
May, 2020	3047		1167	106574.00
June, 2020	9872		-	321708.00
July, 2020	5179		-	207160.00
August, 2020	8950		-	403100.00
September, 2020	6399		-	269320.00
October, 2020	5479		-	222160.00
November, 2020	4010		-	160400.00
December, 2020	3015		-	122158.00
January, 2021	1440		-	57600.00
February, 2021	1028		-	49227.00
March, 2021	2605	102	30	125942.00
Advance receipt				1000000.00
Total	**51024**	**102**	**1197**	**30,45,349.00**

Constraints

There is urgent need of one layer shed for 1000 birds. ICAR-PSP hatchery is the only source of chicks in the state. Also because of expansion of National Highway, old layer sheds were dismantled and currently we are housing the birds in temporary sheds.

ICAR-National Organic Farming Research Institute, Gangtok, Sikkim

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

Two batches 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 6.

Egg production

The average HDEP in *Vanaraja* of batches 10 and 11 is given below in Table 7. Peak production (71.26%) was recorded in 34th weeks of age.

Table 6. Body weight (kg) of *Vanaraja* parents

Age (wks)	Female line	Male line
4	0.248	0.279
6	0.383	0.420
12	1.132	1.244
16	1.432	1.634
20	1.862	2.297

Hatching performance

The average fertility and hatchability (TES) in *Vanaraja* female line of the two batches were 85.59% and 63.80 %, respectively.

Germplasm supply and Revenue generation

A total of 69241 chicks were supplied during the period in which 46572 chicks supplied under Tribal Sub Plan. There were 231 villages covered and 1992 farmers benefited through the center during the period. An amount of Rs. 33,95,106/- revenue was generated by supplying germplasm during the period.

Feedback

Backyard poultry was demonstrated in many parts of Sikkim. The farmers were satisfied with the performance of birds in their situation.

Table 7. Egg production (%) in *Vanaraja* parent birds

Age (wks)	10th Batch	11th Batch
28	34.78	28.69
36	67.56	57.66
40	60.30	63.88
52	44.53	44.50
64	47.16	59.29
72	49.21	46.09
80	44.66	29.39

Regional Centre of ICAR Research Complex, Imphal, Manipur

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 period three batches of *Vanaraja* parents and two batches of *Srinidhi* parents were maintained under deep litter system. The older stock of *Gramapriya* was also maintained at the centre. The average body weight was recorded after every four weeks till 20th weeks of age and presented in Table 8.

Egg production

The egg production details of the different parent stocks maintained at the centre are provided in the Table 9.

Hatching performance

The fertility and hatchability of the parent stock maintained during the period is given in the Table 10.

Germplasm supply and Revenue generation

During the reporting period 15080 chicks have been supplied in different parts of the state. Revenue generated was Rs 1, 44,030 during this period

Table 9. Egg production (Hen Housed production %) of *Vanaraja* (14th batch), *Gramapriya* (13th batch) and *Srinidhi* (15th batch)

Age (wks)	*Vanaraja*	*Gramapriya*	*Srinidhi*
40	27.42	--	70.50
52	29.71	--	66.35
64	24.78	19.87	54.28
72	17.62	16.01	22.38
80	12.93	10.76	--

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 District in terms of their body weight gain, feed efficiency, egg weight and shank length were recorded. The inputs like feed, medicine and feed supplement were also given to the beneficiaries. The main reason of mortality during initial phase in farmer's field was due to irregular or insufficient electricity supply which was required for brooding of chicks and diseases (coccidiosis, respiratory infection and endoparasite infestation). The beneficiaries did not proile proper health prophylaxis. Field performance of the distributed birds are given in below Table 11 and 12.

Table 8. Body weight (g) of *Vanaraja* and *Srinidhi* birds at different age

	Vanaraja (16th batch)		*Srinidhi* (15th batch)	
Age (wks)	Male line	Female line	Male line	Female line
4	457.2±0.37	312.6±0.65	583.1±1.55	242.7±2.64
8	1163.6±1.22	758.38±1.85	1490.7±2.36	617.7±1.43
12	1474.73±2.53	973.8±5.74	1884.2±1.99	874.7±1.26
16	2265.4±10.6	1638.3±5.54	2578.3±3.51	1363.3±1.93
20	-	-	3125.4±4.96	1668±2.96

Table10. Hatching performance of birds

Parent stock	Fertility (%)	Hatchability on TES (%)	Hatchability on FES (%)
Gramapriya	50.71	23.39	30.59
Vanaraja (14th batch)	54.44	33.86	56.58
Vanaraja and *Srinidhi* (15th batch)	64.74	46.34	65.61

Table 11. Average body weight (g) of *Vanaraja* and *Gramapriya* birds at different ages

	Vanaraja		*Srinidhi*	
Age (wks)	Male line	Female line	Male line	Female line
4	364.42	312.42	322.34	234.73
8	843.12	683.46	813.23	576.21
12	1382.72	912.65	1436.54	826.75
16	1964.21	1433.42	1714.46	1177.45
20	2683.16	1675.05	1964.34	1246.41

Table 12. Performance parameters of *Vanaraja* and *Gramapriya* birds

Parameters	*Vanaraja*		*Srinidhi*	
	Male line	Female line	Male line	Female line
Egg weight (g)	-	56.4	-	54.2
Shank length (cm)	8.9	7.2	8.4	6.4

Constraints

- Non-availability of spare parts for incubator in the state
- Difficult to get poultry feeds during Covid-19 pandemic lockdown.

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

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.

Table 13. Egg production in *Vanaraja* and *Gramapriya* parents

Age (Wks)	*Vanaraja* (IV batch)		*Gramapriya* (IV batch)	
	HDEP (%)	HHEP (No.)*	HDEP (%)	HHEP (No.)*
76	51.8	14.5	35.13	10.3
80	47.7	28.5	46.53	19.0
84	47.1	42.3	34.70	30.0
88	47.6	54.6	40.59	40.1
92	37.8	66.9	32.50	50.3
96	35.7	78.0	30.96	59.5
100	29.6	86.7	32.81	67.5
104	36.8	95.5	45.30	77.0
108	24.3	102.0	39.93	87.1
112	27.6	108.4	30.71	96.8
116	30.0	114.1	38.52	105.4
26	--	--	--	--
30	--	--	--	--
34	--	--	--	--

* HHEP calculated from 72 weeks

Work done

Parent stock

Two batches (IV and V batch) of Vanaraja and *Gramapriya* parents were reared at CPPM, Hosur during 2020-21. The fourth batch was in II laying cycle between 74 and 116 weeks of age and the fifth batch were aged between day-old and 36 weeks of age. A total of 404 and 1424 parents of *Vanaraja* and *Gramapriya* were in position, respectively at the end of reporting period.

Egg production

The hen day and hen housed egg production in *Vanaraja* and *Gramapriya* are presented in Table 13. The hen day egg production ranged from 52 to 30 per cent during 76 – 116 weeks of age with hen housed egg production of 114 for the period between 74 and 116 weeks of age of age in *Vanaraja* (IV batch). Similarly, the hen day egg production ranged from 47 to 33 per cent during 76 – 116 weeks of age with hen housed egg production of 105 for the period between 74 and 116 weeks of age of age in *Gramapriya* (IV batch).

Hatching performance

The hatchability (TES) in *Vanaraja* (IV batch) parents ranged from 65 to 70%, whereas the hatchability (TES) in *Gramapriya* (IV batch) parents ranged from 60 to 72%. The hatchability (TES) in *Vanaraja* and *Gramapriya* (V batch) parents at 28th and 32 weeks of age were ranged from 69 to 75%.

Germplasm supply and Revenue generation

A total of 74,851 improved rural chicken germplasm of *Vanaraja* and *Gramapriya* were distributed to 787 beneficiaries including farmers and entrepreneurs throughout Tamil Nadu during 2020-21. The Centre has generated total revenue of Rs. 23.42 lakhs during the reporting period (Table 14).

Constraints

No constraints were reported during the period.

Table 14. Month wise distribution of the germplasm

Month	Germplasm supply (No)			Number of beneficiary	Revenue generation (Rs.)
	Gramapriya	*Vanaraja*	Total		
April 2020	3,324	2,175	5,499	66	53,530
May 2020	1,617	2,191	3,808	41	1,82,372
June 2020	3,562	6,342	9,904	92	3,42,294
July 2020	2,589	2,933	5,522	65	4,68,209
August 2020	2,891	3,692	6,583	71	1,94,414
September 2020	2,191	2,693	4,884	35	68,817
October 2020	2,145	2,400	4,545	51	1,15,736
November2020	2,137	2,654	4,791	56	2,05,871
December2020	2,506	1,980	4,486	55	1,35,449
January 2021	1,617	1,752	3,369	30	1,34,618
February 2021	4,087	2,585	6,672	75	1,24,985
March 2021	7,719	7,069	14,788	150	3,16,084
Total	**36,385**	**38,466**	**74,851**	**787**	**23,42,379**

Central Coastal Agricultural Research Institute (CCARI), 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 parent stocks of *Vanaraja* and Krishibro were reared at this centre during the reporting year. The body weights of female and male parents of *Vanaraja* were 1210 ± 43.12 g and 1568 ± 73.61g at 30 weeks of age, and 2285 ± 88.12g and 3109 ± 105.60g at 60 weeks of age, respectively. In Krishibro birds the body weights of female and male parents were 1465 ± 56.09g and 1879 ± 82.64 g at 30 weeks of age, and 3240 ± 113.78g and 4005 ± 126.23g at 60 weeks of age, respectively. In *Vanaraja* parents, the hatchability on fertile egg set (FES) basis was 60-69% at 40 weeks and 75-82% at 63 weeks. The average daily egg production was 43.18% during 40 to 63 weeks of age and mean egg weight was 55.20 ± 0.35g in *Vanaraja* birds.

Germplasm supply

Total of 35,822 improved chicken germplasms were distributed to 951 farmers of Goa, Maharashtra and Karnataka with the revenue generation of Rs. 8,32,206/- A total of 2750 numbers of *Vanaraja*, *Gramapriya* and Krishibro chicks along with starter and grower feed, medicines, equipments such as feeders and waterers, extension folders etc. were distributed to 57 farmers of Goa, Karnataka and Maharashtra states under SCSP and TSP component of PSP as well as institute budgetary provision. The supply of germplasm to nearby coastal states was severely affected by COVID-19 related lockdown and bird flu.

Table 15. Body weight (g) in *Vanaraja* and Krishibro male and female lines

	Vanaraja		Krishibro	
Age (wks)	**Male**	**Female**	**Male**	**Female**
30	1568 ± 73.61	1210 ± 43.12	1879 ± 82.64	1465 ± 56.09
35	1724 ± 68.36	1356 ± 38.57	2180 ± 92.09	1762 ± 72.17
40	2081 ± 70.14	1598 ± 45.78	2436 ± 79.33	1998 ± 62.19
45	2306 ± 87.08	1631 ± 86.53	2769 ± 100.21	2268 ± 85.77
50	2589 ± 99.56	1710 ± 61.22	3162 ± 89.67	2598 ± 77.52
55	2890 ± 98.75	1862 ± 96.48	3675 ± 94.54	2889 ± 98.88
60	3109 ± 105.60	2285 ± 88.12	4005 ± 126.23	3240 ± 113.78

Table 16. The performance of poultry birds in farmers' field

Birds (n=100)	Mean body weight (g) at six months age (Male)	Mean body weight (g) at six months age (Female)	Average Egg production/ year
Vanaraja	1271 ± 63.69	1080 ± 45.21	105
Gramapriya	1195± 44.75	1076 ± 75.62	157
Krishibro	1579 ± 78.14	1265 ± 56.09	-

Feedback from the farmers' field

The performance of *Vanaraja*, *Gramapriya* and Krishibro birds in the farmers' fields were recorded and presented in the Table 16.

Based on farmers' feedback, under the field condition there was knowledge gap regarding fertile egg selection, incubation and hatching. Field demonstration was done for collection, cleaning, and transportation of hatching eggs to our institute. There is facility for hatching eggs at institute hatchery unit for needed farmers. To address their need two extension folders were published and distributed for awareness and enhancement of scientific knowledge among them. One folder "Incubation and hatching: problems and prevention" was published for management practices and hatching of poultry eggs in farmers' field. Other one was "Poultry as a component in agro-ecotourism" mentioning different backyard poultry varieties and ornamental birds which can be an integral component in farmers' flock.

Central Island Agricultural Research Institute (CIARI), Port Blair

Activities assigned

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

Work done

Parent stock

During the period, a total of 150 *Vanaraja* parents were reared. A total of 2283 numbers of hatchable eggs were produced during the period from 30 to 50 weeks of age. The age at sexual maturity (ASM) was 209 days with average egg weight of 38.19±5.2 g. An egg weight of 55 g was reached at 40 weeks of age. The age at 5% egg production was 230 days. The body weight during the period of 30 to 50 weeks of age ranged from 3.21±0.33kg to 4.84±0.2 kg in males and 2.36±0.4 to 3.18±0.3kg for females.

Table 17. Body weight (g) in *Vanaraja* parents

Age (wks)	Male	Female
0 day	36.4 ± 1.52	35.3 ± 1.15
4	765.25±9.06	205.65 ±8.05
20	2351.6±21.12	2166.85±7.19

Germplasm supply

During the period a total of 4503 germplasms of hatchable eggs were supplied. A revenue of Rs. 96625/- was generated.

ICAR Research Complex for NEH Region, Umiam, Meghalaya

Activities assigned

- Construction of civil works
- Maintenance of parent stock for continuous supply of fertile eggs, chicks of improved chicken varieties
- Recording the growth and reproductive performance in *Vanaraja* parent lines
- Collection of data on performance of *Vanaraja* birds from farmers' field and reporting their feedbacks

Work done

Parent stock

Two batches of *Vanaraja* parents were procured and reared under deep litter system at 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 18 and 19.

Feedback from the field

The performance of *Vanaraja* birds in the farmers' fields and the farmers feed backs were recorded and presented in tables 20 and 21.

Germplasm supply

Total of 15,177 chicks were supplied and revenue of Rs.9, 95,534/- was generated during period.

Under the TSP component of the Poultry Seed Project, one hundred tribal farmers from different districts of

Table 18. Body weights (g) in *Vanaraja* male and female lines

	Vanaraja Parent lines	
Age (wks)	**Male**	**Female**
0	39.31±0.77	36.23 ± 1.09
4	372.55±8.52	217.45 ± 7.05
8	743.00 ± 11.56	522.34 ± 11.13
12	1060.45 ± 25.73	960.00 ± 20.92
16	1620.00 ± 85.23	1490.00 ± 76.75
20	2971.50 ± 110.65	1753.60 ± 56.27

Table 19. Reproductive performance of *Vanaraja* parent lines

Traits	Values
Age at first egg (days)	155
Average body weight at first egg (g)	1760
Average HDEP from 28-52 weeks (%)	39.06
Fertility (%)	86.56
Hatchability on TES (%)	66.80
Hatchability on FES (%)	77.19

Table 20. Growth and mortality records of *Vanaraja* birds at farmers field (Mean±SE)

Age (wks)	Body weight (g)	Mortality (%)
4	251.58±3.41	2.70±0.14
6	423.29±6.50	1.87±0.11
8	638.44±10.92	0.69±0.05
10	1057.95±18.81	0.63±0.06
12	1259.88±28.17	0.76±0.07
14	1490.28±48.22	0.00±0.00
16	1530.02±76.88	0.00±0.00
18	1638.69±53.79	0.44±0.11
20	1790.65 ± 64.29	0.00±0.00
22	1825.28 ± 97.45	0.00±0.00
24	1910. 23 ± 102.32	0.00±0.00
26	2010.10 ± 107.54	0.00±0.00
32	2135.22 ± 100.25	0.00±0.00
36	2360.19 ±115.21	0.00±0.00
40	2541.39 ± 148.45	0.00±0.00

Table 21. Egg production parameters of *Vanaraja* birds at farmers' fields

Traits	Values
Average age at first egg (days)	156
Average body weight at first egg (g)	1652.34
Average hen day egg production at 40 weeks (%)	21.17
Average egg weight (g) at 40th week	54.32

Meghalaya were imparted training on rural poultry production aspects. A total of 7025 numbers of *Vanaraja* chicks along with feeding and water troughs, feed, medicines etc. were provided to 367 numbers of tribal farmers from different districts of Meghalaya during the period.

To monitor and provide technical guidance to the farmers' one WhatsApp group was created and information provided. Two exposure visits of local farmers of Meghalaya to the institute poultry farm were arranged to acquaint them with basic poultry housing, feeding and health management systems.

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

Activities assigned

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

Work done

Parent stock

This centre maintained two batches of Vanaraja parents during the year out of which one batch was in laying stage. A total of 551 females and 115 males aged 39 weeks were in position as on 01st April 2020. The body weights of male and female parents at different ages are provided in Table 22. Another batch of *Vanaraja* parent stock was received in October 2020. The average body weight was recorded after every four weeks till 20 weeks of age and presented in Table 23.

Table 22. Body weight (g) of *Vanaraja* parent stock

Age (wks)	Male	Female
43	3256±82.34	2404±56.86
48	3332±85.97	2356±67.84
51	3131±96.43	2398±55.43
56	3342±87.11	2412±65.43
59	3452±80.45	2312±65.65
63	3509±85.04	2378±61.23
67	3452±76.53	2401±59.54
71	3420±80.87	2471±61.11
75	3372±77.90	2346±56.79
77	3310±83.32	2301±53.63

Table 23. Body weight (g) of *Vanaraja* parent stock upto 20 weeks of age.

Age (wks)	Male	Female
0 day	41.93±4.76	35.08±3.65
04	401.34±12.56	347.56±10.65
08	875.74±32.33	539.46±27.42
12	1345.89±53.41	886.64±36.76
16	1789.34±76.97	1109.87±65.43
20	2412.69±87.82	1967.00±68.84

Egg Production

The average age at first lay was recorded as 174 days. Peak HDEP (61.15%) achieved at 48 weeks of age (Table 24). In the younger batch of parent stock the age at first lay was recorded as 169 days. At the age of 25 weeks the HDEP was 1.2%.

Table 24. Egg production of parentstock

Age (wks)	HDEP (%)
39*	3.45
43	54.35
48	61.15
52	52.21
56	48.44
61	45.53
65	17.10

* Complete COVID-19 Lockdown

Hatching Performance

The information on hatchability of eggs from *Vanaraja* parents are presented in Table 25. The highest hatchability (TES) was 68.91%.

Table 25. Hatching performance of *Vanaraja* parents

Parent's age (wks)	Hatch No	H(TES)%	H(FES)%
43	1	56.87	63.19
	2	68.91	77.39
	3	63.64	69.82
48	4	6.48*	49.45
	5	51.53	60.59
	6	43.25	51.21
	7	56.52	66.46
52	8	44.78	53.11
	9	44.53	52.49
	10	47.13	55.88
	11	63.97	74.89
56	12	53.49	64.07
	13	50.34	61.35
	14	13.52**	17.55
	15	40.93	51.79
	16	45.52	59.86
61	17	41.48	54.70
	18	47.53	64.44

* Fertility problem ** Long-term power breakdown

Germplasm supply

A total of 17260 germplasm was distributed to farmers of Jammu and Kashmir during the year and generated Rs. 7,07, 350 as revenue by sale of chicks and eggs.

Tribal Sub-Plan Activities

Tribal Sub-plan activities took place from March 22 to 26, 2021. The trainings, exposure visits and input distribution were organized in collaboration with Animal Science Scientists from Division of LPM, Faculty outreach Center/Division of Extension, KVKs of Budgam, Shopian, Pulwama, and Ganderbal.

Performance of commercial Vanaraja chicks under field conditions

The performance of Vanaraja under intensive rearing and backyard system are presented in Tables 26 and 27.

Table 26. Body weight of commercial *Vanaraja* chicks as reported by farmers rear *Vanaraja* chicks under intensive system for meat purpose

Age (wks)	Body wt (g)		
	Farmer-I	Farmer-II	Farmer-III
0	38.27±0.48	35.87±0.29	36.75±0.35
1	73.97±0.96	71.55±2.06	71.22±1.14
2	159.75±3.36	138.14±0.98	152.12±2.30
3	235.86±3.81	229.73±6.71	232.41±3.64
4	305.77±2.33	317.53 ± 10.53	331.54 ± 10.13
5	499.87 ± 6.51	448.691 ± 3.86	482.20 ± 14.20
6	617.47 ± 16.02	540.03 ± 12.61	667.23 ± 19.21
7	918.37 ± 16.64	865.43 ± 18.43	938.08 ± 21.40
8	1108.68 ± 21.75	1064.46 ± 20.28	1182.30 ± 19.24

Table 27. Performance of commercial *Vanaraja* chicks as reported by farmers rearing *Vanaraja* birds under backyard system

Growth	
Age	**Body weight (g)**
4 month	1200
6 month	2650
12 months	3300 (Female) 4200 (Male)
Mortality	
Mortality	**10-20%**
Causes of mortality	Predation, Respiratory and Gastrointestinal diseases and Leg weakness
Egg production	
Age at First egg	**6-7 months**
Egg production	15-20 eggs in a month

Sri Venkateswara University, College of Veterinary Science, Tirupati

Activities assigned

- Rearing of parents and supply of fertile eggs and chicks
- Supply of chicks under SCSP programme

Work done

Civil works

Construction of vaccination room for day old chicks is underway.

Parent stock

A total of 350 parents of *Vanaraja* chicks were procured for replacement stock as 3rd batch from the Directorate of Poultry Research, Rajendranagar, Hyderabad during the month August 2020. Further, during the above period existing batch parent birds (2nd batch) were maintained for germplasm supply.

The body weights of present batch of *Vanaraja* at 20 weeks of age were 2466 and 2079.75 in male and female birds respectively. Age at sexual maturity was 141 days. A total of 29,157 germplasm supplied. The hen day egg production ranged from 21% to 56% during 21-30 wks period and the hatchability ranged from 42 to 50.44 % from 21 to 30 wks period. The body weights, egg weight and egg production of 2nd and 3rd batch were given in Table 28.

Egg production

The hen day egg production in two batches of *Vanaraja* parents reared during the period is presented in Table 29. The highest percent hatchability in the 2nd batch was 89% and in 3rd batch was 50.44%.

Germplasm supply

A total of 29,157 germplasm was supplied benefitting 355 farmers. An income of Rs 3,87,355/- was generated by sales of chicks, eggs and birds. A total of 450 birds were distributed to the SC farmers. Along with birds, feed, feeders, waterers, crates were also supplied.

Table 28. Body weights (g) of *Vanaraja* parents

Age (wks)	Male	Female	Age (wks)	Male	Female
	3rd Batch			2nd Batch	
4	185.22 ±26.56	152 ±32.93	40	3272.78±184.43	2477.21±68.43
8	743.83±101,96	615 ± 78.05	44	3363.31±293.59	2483.84±58.43
12	1329.29±199.85	1196.25±264.74	48	3534.67 ± 245.61	2546.46±92.45
16	2230.15±375.82	1646.32 ±188.65	52	3562.43± 311.03	2716.67±110.44
20	2466.78±311.33	2079.75 ±314.17	56	3784.00± 302.59	2789.32±143.89
24	2683.22±516.23	2205.67 ±276.59	60	3792.34± 356.43	2859.95±210.32
28	2975.26±550.22	2385 ±196.68	64	3802.56± 236.72	2858.77±321.55
30	2995.67 ±795 12	2477.69 ±203.22	68	3845.37± 224.65	2906.45±235.33
			72	3872.25 ± 356.91	2934.67±250.87

Table 29. Egg production and Lathality in *Vanaraja* Parents

Age (wks)	Egg wt (g)	HDEP (%)	Hatchability (%)	Age (wks)	Egg wt (g)	HDEP (%)	Hatchability (%)
2nd batch				3rd batch			
24	34.23	16	44	21	39.17	21	42.13
28	41. 44	39	59	25	47.26	44	47.77
32	49.22	67	68	30	51.23	56	50.44
36	51.63	75	75				
40	53.80	79	79				
44	54.27	68	87				
48	55.89	64	85				
52	56.15	62	89				
56	57.67	58	72				
60	58.03	55	65				
64	58.76	52	61				
68	58.83	48	55				
72	58.95	45	40				

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

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 improved native chicken commercials (Vanashree) at Poultry Seed Project, Livestock Research Station, Mamnoor during the reporting period are shown in Table 30. The rearing period body weights of the above parents, *Gramapriya* and improved native chicken Commercial stock (Vanashree) are presented in Table 31.

Egg production

The *Gramapriya* parent stock 1st batch was in their 58th week of age during the period under review i.e., April, 2020. The hen housed egg production at 72 weeks was 47.51 % and hen day egg production was 30.94 %.

While the hen housed egg production of Vanashree commercials at 40 weeks of age was 28.79% and *Gramapriya* parent 2nd batch was 19.40%, and the hen day egg production was 24.62 % and 16.46 %, respectively (Table 32).

Table 30. Stock position of parents (*Gramapriya*) and Commercial stocks (improved native chicken – Vanashree)

S.No.	Stock	Received on	Age as on April, 2020	Stock as on April, 2020		Total	Stock as on March, 2021		Age as on Mar, 2021 (wk)	Total
				Males	Females		Males	Females		
1	*Gramapriya* (1st batch) Parent stock	2019	58	77	378	455	-	-	-	Culled in the month of January, 2021
2	Vanashree commercials (improved native chicken)	Nov, 2019	19		581	581	77	211	70	288
3	*Gramapriya* (2nd batch) parent stock	Mar, 2020	5		318	318	40	155	56	195
	Stock received after April, 2020.									
4	Vanashree commercials (improved native chicken)	Sep, 2020	-		200	200		190	26	190
5	*Gramapriya* (3rd batch) parent stock	Oct, 2020	-		1238	1238	84	1005	21	1089

Table 31. Body weight (g) in parents (*Gramapriya*) and Commercial stocks (improved native chicken – Vanashree)

Age (wks)	Vanashree		*Gramapriya* parents 2nd batch		Vanashree		*Gramapriya* parents 3rd batch	
	Male	Female	Male	Female	Male	Female	Male	Female
4	-	-	-	-	0.442 ± 10.94		0.262 ± 1.88	0.168 ± 1.63
6	-	-	0.620 ± 2.11	0.530 ± 1.68	0.841 ± 17.87		0.710 ± 1.93	0.698 ± 1.57
12	-	-	1.002 ± 5.32	0.780 ± 5.89	1.735 ± 25.82		1.600 ± 5.46	0.850 ± 4.88
16	-	-	1.410 ± 7.78	1.100 ± 5.63	1.970 ± 28.42		1.700 ± 8.24	1.150 ± 6.78
20	2.200 ± 8.04	1.302 ± 6.32	2.100 ± 7.22	1.200 ± 6.01	2.500 ± 17.23	2.000 ± 18.01	2.100 ± 8.11	1.300 ± 6.01

Table 32. Production performance in parents (*Gramapriya*) and Commercial stocks (improved native chicken – Vanashree)

	Traits	*Gramapriya* parent 1st batch (reared in cage house)	Vanashree (reared in deep litter)	*Gramapriya* parent 2nd batch (reared in cage house)
32 wks	HDEP (%)	-	34.90	23.70
	HHEP (%)	-	36.50	23.80
	Egg weight (g)	-	50.23 ± 0.14	49.23 ± 0.58
40 wks	HDEP (%)	-	24.62	26.46
	HHEP (%)	-	28.79	29.40
	Egg weight (g)	-	52.58 ± 0.18	52.78 ± 0.54
52 wks	HDEP (%)	-	31.26	24.13
	HHEP (%)	-	38.84	30.89
	Egg weight (g)	-	55.11 ± 0.22	54.36 ± 0.48
64 wks	HDEP (%)	42.58	29.19	-
	HHEP (%)	51.80	35.79	-
	Egg weight (g)	56.20 ± 0.20	55.09 ± 0.28	-
72 wks	HDEP (%)	30.94	-	-
	HHEP (%)	47.51	-	-
		55.61 ± 0.42	-	-

Hatching performance

The hatching performance of different newly developed backyard poultry varieties (*Gramapriya* parents and Vanashree commercials) in terms of fertility and hatchability is presented in Table 33.

Table 33. Hatching performance in parents (*Gramapriya*) and Commercial stocks (improved native chicken – Vanashree)

Age (wks)	*Gramapriya* parent 1st batch			Vanashree commercial (reared in deep litter system)			*Gramapriya* parent 2nd batch		
	Fertility (%)	Hatchability (%)		Fertility (%)	Hatchability (%)		Fertility (%)	Hatchability (%)	
		TES	FES		TES	FES		TES	FES
28	-	-	-	52.54	22.03	41.94	90.32	87.10	96.43
36	-	-	-	73.16	54.84	74.96	89.46	77.63	86.78
40	-	-	-	90.40	55.20	61.06	91.51	81.76	89.35
52	-	-	-	87.78	49.44	56.33	89.26	54.07	60.58
72	77.59	59.81	76.93	-	-	-	-	-	-

Table 34. Month wise supply of the germplasm and revenue generation

Month wise	Germplasm Supply (no.)	Revenue Generation (Rs.)	Farmers Benefitted
April, 2020	3,056	37,127	10
May, 2020	2,627	45,040	10
June, 2020	1,910	33,514	7
July, 2020	3,799	83,617	13
August, 2020	3,283	67,540	12
September, 2020	3,486	78,436	22
October, 2020	3,222	67,492	21
November, 2020	3,692	84,715	23
December, 2020	3,692	79,883	25
January, 2021	1,994	47,174	8
February, 2021	1,068	27,203	7
March, 2021	1,582	39,912	9
Total	33,411	6,91,653	167
Sale of surplus culled and spent birds		1,04,573	
Table eggs		17,518	
Fertile eggs	45	765	2
Grand Total		**8,14,509**	**169**

Germplasm supply

A total of 33,411 day old chicks and about 45 fertile eggs of *Gramapriya* and Vanashree were supplied to 169 farmers (all the values are inclusive of the values shown under SCSP). A total revenue of Rs. 8.15 lakhs was generated during the period. A total of 8,110 day old chicks of *Gramapriya* and Vanashree were supplied to 36 farmers under SCSP plan.

Constraints

Not able to meet the supply demand, hence there is a need to expand the production capacity by constructing an elevated platform cage house for parent layer stock for better management, health care and precision nutrition

Critical Observations

BAU, Patna

Accomplishments and achievements

- Two batches of parents were reared
- Supplied 50495 chicks of *Vanaraja* to farmers
- Generated Rs. 22.25 lakhs of revenue
- Achieved the target of germplasm supply

Suggestion for further improvement

- Germplasm supply need to be improved.

RC of ICAR Research Complex, Jharnapani

Accomplishments and achievements

- Two batches of parents one each *Vanaraja* and *Srinidhi* were reared
- A total of 51,024 improved chicken germplasm was distributed to the farmers
- An amount of Rs. 30.45 lakhs revenue was generated

Shortfall

- Field data not provided
- Target of germplasm not achieved

Suggestion for further improvement

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

ICAR-NOFRI, Gangtok

Accomplishments and achievements

- Two batches of *Vanaraja* parents were in position
- Distributed 69,241 chicks to the farmers in the rural and tribal areas of Sikkim
- An amount of Rs. 33.95 lakhs of revenue was generated
- The target supply was achieved

Short fall

- Field data not provided

Suggestion for further improvement

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

RC of ICAR Research Complex, Imphal

Accomplishments and achievements

- Three batches of *Vanaraja*, *Gramapriya* and *Srinidhi* parents were reared
- The centre has supplied 15,080 chicks to farmers
- An amount of Rs. 1.44 lakhs of revenue was generated
- Field data collected

Short falls

- Target of germplasm was not achieved

Suggestion for further improvement

- Efforts should be made to achieve the target supply

TANUVAS, Hosur

Accomplishments and achievements

- Three batches of parents were in position
- Distributed 74,851 chicks of *Vanaraja* and *Gramapriya* to the farmers in Tamil Nadu
- Generated an amount of Rs. 23.42 lakhs revenue

Short fall

- Field data not reported
- 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 35,822 chicks to the farmers and generated Rs. 8.32 lakhs revenue

Short fall

- Target supply not achieved

Suggestion for further improvement

- Efforts should be made to meet the target supply

ICAR-CIARI, Port Blair

Accomplishments and achievements

- Two batches of parents were reared
- Distributed 4503 improved germplasm to the farmers
- Generated Rs. 0.96 lakhs revenue

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 14,631 chicks to the farmers.
- Generated Rs.7.07 lakhs revenue

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

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

ICAR-RC for NEH Region, Umiam, Meghalaya

Accomplishments and achievements

- Two batches of parents were reared
- Distributed 15,177 improved germplasm to the farmers
- Generated Rs. 9.95 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

- Five batches of *Vanaraja*, *Gramapriya* and *Vanasree* were reared
- Distributed 33,411 chicks to farmers
- Revenue was Rs. 8.15 lakhs

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

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

SVVU, Tirupati

Accomplishments and achievements

- Two batches of *Vanaraja* parent were reared
- Distributed 29,157 chicks to farmers
- Generated Rs. 3.87 lakhs revenue

Short fall

- Germplasm supply target not achieved

Suggestion for further improvement

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

Success Stories AICRP on Poultry Breeding and Poultry Seed Project

Young tribal farmer upscale back-yard system akin to pastured poultry, in orchards at hilly tribal region of Bharmour, Himachal Pradesh (CSKHPVV, Palampur)

Challenge: In state of Himachal Pradesh focus on backyard poultry gained momentum from beginning of 21st century although earlier isolated efforts were directed way back during 1990. This has happened because of various developmental schemes of central government on improving backyard poultry farming initiated during the period. Development interventions should respond to the specific needs of the target group and, therefore, may involve single or multiple stages. For promoting backyard poultry production in rural areas, dissemination of improved germplasm and establishment of backyard poultry units to targeted sections of population (women, farmers and unemployed educated youth) is needed Situation analysis of the perceptions, constraints needs and priorities of poultry farmers and local conditions is essential prior to suggesting suitable production system and numbers and type of birds. 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 input and management. Sh. Jagan Singh S/o Sh. Kishori Lal, VPO Bharmour of Distt. Chamba Himachal Pradesh involved in multifarious agricultural activities has taken up the rural poultry production on pasture/free range on increased scale.

Initiative: During the release of location specific poultry variety "*Himsamridhi*" during Annual Review Meet of All India Coordinated Research on Poultry Breeding during May 2017 the farmer was selected as one beneficiary provided with 50 chick units and other inputs. After rearing the location specific poultry variety "*Himsamridhi*" developed by AICRP on poultry breeding, (Rural unit) Palampur, he became very much interested to start venture like extensive scavenging system or pastured poultry. Seeing his interest to upgrade the system and to take it on the larger scale AICRP team provided him with the refresher course and discussed/ explored the possibility of up scaling the venture and market survey. He was advised to take lot of around 500 DOC of *Himsamridhi*. He was supplied 400 chicks during December 2019 so as to have at least 150 layers during season and able to sell around 150-180 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 shifted the birds after growing stage in to his pasture/unutilized area near orchards, so as to provide extensive scavenging area of around 20-25 square feet per bird during scavenging. The birds started laying eggs in mid of June-July, 2020 at around 6 months of age. He is retaining the laying hens till date with few culling. The male birds/cockerels which attained body weight of 1.6-2.0 kg at about 5-months of age were sold as per need/demand @ Rs.500-600/per bird giving him return of Rs 80,000/- in six-month duration from sale of cockerels, resulting in income of around 50000 after accounting for various inputs. According to Sh. Kishori Lal during the peak season he earned handsome returns by selling of cockerels at premium price since country chicken is in great demand during the winter season. The egg production of female birds was around 70-80 eggs per day from around 150 layers during the peak production in 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 60-65 egg daily giving him return of Rs. 500-600 per day, and after the accounting the input expenditure net profit in month is around 10000-12000/month. He adopted mixed system of scavenging with grains for rearing poultry birds keeping the input cost at bare minimum. Poultry litter was effectively utilized in his other agricultural/horticultural activities. He also practices supplementation with vitamins, minerals and calcium from time to time. A portion of eggs produced and cockerels were also consumed in the family to improve their nutritional quality.

Impact: Sh. Kishori Lal is now making handsome profit in backyard poultry farming with improved LIT birds

of *Himsamridhi*. Since he has good land holding and sufficient forage and scavenging area there is branding of his poultry produce as organic/free range in the area. Also the system has benefit in terms of reduce incidence of vent peking, welfare of birds and litter related problem of foul smell are reduced owing to the sufficient space and scavenging areas. With his experience of farming activities he up-scaled the backyard poultry activities under extensive scavenging system. He has also integrated mushroom cultivation to further maximise the gains. He is continuing with this occupation adding replacement batches of 200-300 chicks at periodical intervals.

Success storey of Shri Safarmia a poultry farmer from Tripura

(ICAR-RC for NEH, Tripura)

Shri Safarmia S/o Abdul Ajij is a progressive farmer belonging to village Aralia, Loknath Ashram, Dugri, West Tripura involved in broiler farming since last 16 years. After coming in contact with AICRP on poultry breeding, Tripura centre, Agartala, it was found that he is interested to rear this newly developed variety (BND Cross). During surveys and further interactions, he mentioned lack of good quality chicks and institutional support as major constraint for poultry farming and during interaction with AICRP staff he was motivated to rear the improved backyard poultry birds developed by ICAR under the project. Shri Safarmia was supplied with 500 chicks to start his poultry rearing and extended technical advice from time to time including preventive measures against major diseases. He also practices supplementation with vitamins, minerals and calcium at his farm from. The mortality in his flock was very less (less than 3%) during the chick and growing phases. The male birds/cockerels

which attained body weight of 2000–2500 gm. at about 6-months of age were sold as per requirement from time to time @ Rs. 280/per kg live wt giving him a handsome income of Rs 90000/- in six-month duration. The egg production of female birds was around 160-200 eggs per day during the peak production. During four month of laying period, he was getting Rs. 1000/- net profit per day by selling the eggs at the rate of Rs. 10-12 per egg. After 4 month of egg collection he sold out his all birds due to his requirements. Thus, he made total a net profit of around 1.50 lakhs rupees by 500 birds in 9 month of rearing period. He became very happy because he earned very high profit by rearing this newly developed bird in compare to broiler chicken. Shri Safarmia has expanded his poultry house and included the facility for proper ventilation and light as guided. Earlier he and his wife was looking farm but now he kept an extra worker at his farm for the management of birds. Presently, he is earning approximately Rs. 30000 to 40000 net income per month through poultry farming. Every year he procures 4-5 lots of chicks from AICRP centre, Lembucherra and now he is happy to take BND cross chicks since demand is very much increasing and he is selling it at higher price than broiler chicken.

A success story of a farmer from West Tripura: Poultry production and livelihood security (ICAR-RC for NEH, Tripura)

Shri Tapan Debnath a poultry farmer from village Rani Bazar, Durganagar, West Tripura suffered from financial crisis and struggled for survival with his 6 member family. After coming in contact with AICRP on poultry breeding, Tripura centre, Agartala, it was found that he

is interested to rear this newly developed variety (BND Cross). He was earlier keeping broiler farming for last ten years. Shri Tapan Debnath was supplied 350 chicks to start and extended technical advice from time to time including preventive measures against major diseases. The mortality in his flock was very less (Total 10 no) during the 3 months of rearing periods. The birds attained body weight of 900-1200 gm at 3-months of age was sold as per requirement @ Rs. 290/per kg giving him a net profit of Rs 45600/- in three-month duration. He became very happy to income generated from rearing of BND backyard poultry birds. Now he regularly procures chicks from AICRP centre Agartala and sells the birds at higher price than broiler chicken. Now he is happy with income generated from rearing this improved variety backyard poultry birds and able to maintain livelihood security of his family.

Name	Shri Tapan Debnath
Address	Rani Bazar village, Durganagar, West Tripura district, Tripura
Input to the farmers	350 day old BND chicks
Rearing system	Deep Litter system
Cost of chicks @20/ chicks	350 chicks x Rs. 20 = Rs. 7000
Cost of feeds till 3 months	18 bags x Rs. 2000 = Rs. 36000
Cost of medicines, vaccines, litter and electricity etc.	Rs.10000
Total expenditure	Rs. 53000
Sale of birds at the age of 3 month @ 290/kg	340 birds x 1 kg, 340 kg x Rs. 290 = Rs. 98600
Income	Rs. 98600
Net profit in 3 month	Rs. 45,600
Average monthly income	Rs. 15,200

"*Kamrupa*" rearing as a source of income in rural condition of Assam (AAU, Guwahati)

Name of the farmer/entrepreneur : Mr.Akhim Nath

Address with phone number and email: Village Nisinta, P.O and PS. Agia, Dist Goalpara, Assam. Telephone number 8473944283

Background of the farmer: Mr.Akhim Nath is an unemployed youth. He wants to get himself engaged in poultry farming and also earned his livelihood through poultry farming. He had a very good plot of land which is suitable for poultry 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. Akhim Nath who is a unemployed youth 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 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 :)

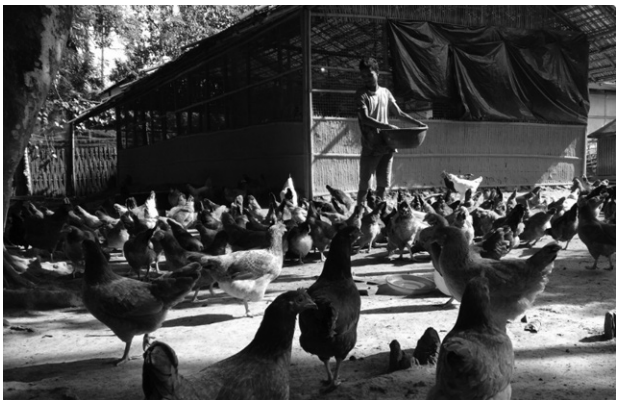
The farmer had been given a detailed information about rearing of "*Kamrupa*" in respect of its management from chick to adult stage.The farmers had been taught about the nutritional and health coverage management of *Kamrupa*.He has been given a brochure where detail information about "*Kamrupa*" had 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.

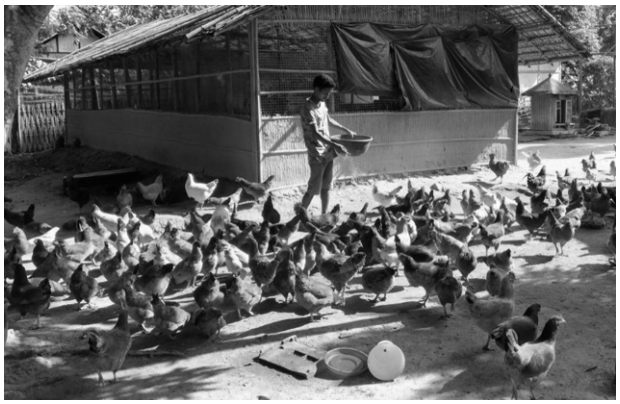
Achievements:

Mr Nath received on an average 300 nos. of *Kamrupa* DOC per batch , from where around 269 birds survived till 5 months. He sold the birds at 5 months @ Rs. 310/ kg. At this age the weight of the birds were average 1.6 Kg. He got an average profit Rs. 66124/- by selling the birds per batch . 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.

Socioeconomic impact:

After getting the required information from AICRP on Poultry Breeding he procured on an average 300 birds from us per batch. He earned handsome money of average Rs. 13225.00/month and it gives him inspiration towards poultry farming. It is learnt that knowledge, strong determination and hard working is the key of success in any sector. Though some outbreak of diseases are encountered but this can be overcomed by strong biosecurity measures.Being a retired person the profit earned through rearing of *Kamrupa* has given him a boost to run his family comfortably and hence it effect positively on socioeconomic aspect of the family





Livelihood promotion through "*Kamrupa*" rearing in rural condition of Assam (AAU, Guwahati).

Name of the farmer/entrepreneur: Mr. Ripunjay Nath

Address with phone number and email: village Nisinta P.O and P.S Agia, District Goalpara, State Assam, Tel is 9854102164

Background of the farmer:

Mr. Ripunjay Nath village Nisinta P.O and P.S Agia, District Goalpara is an unemployed youth and rear some indigenous bird to get some amount for his daily expenses.He is coming to college of veterinary Science in search of a job.As an poultry consultant I have advice him to start a poultry farm with *Kamrupa* .He picked up and started the farm with *Kamrupa* .Gradually he enhanced his 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, Goalpara district is one of the important district in terms of poultry rearing as the demand of poultry meat is very high in this area. Though some of the people of this area follow scientific managemental practices but majority of the people rear indigenous bird in mostly traditional method. Therefore the production of poultry egg and meat in this area is very low. To earn a better profit and have better livelihood through more profit Mr Nath procured "*kamrupa*" chick and reared in scavenging condition.He got more profit in compare to indigenous flock and he 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 :)

Mr. Ripunjay Nath village Nisinta P.O and P.S Agia, District Goalpara who was also an unemployed youth and rear some indigenous bird but it is not at all economical as the productivity of indigenous is very low. As an poultry consultant I have advice him to start a poultry farm with *Kamrupa* and also given a preliminary training about rearing of poultry in general and *Kamrupa* in particular with all details.

Achievements: Mr. Nath received on an average 200 nos. Chicks in every batch from which 175-180 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. 275/bird and some of the bird sold @ Rs. 300/bird. The weight of the bird were at the range of 750-1000 g. He got an average of profit Rs. 7500/month and Rs.90000/ year.(feed per bird upto 2 months 4 Kg @25 so 100 for feed 100x200=20000 chick 26x200=5200 so total 25200 and othe r misc 4800 so total 30000 sale proceed 750+1000/2=875 @ 275+300=575/2=287.5x.87 5x175+180/2=43946 app 45000 that is 7500/month

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 flue. To overcome the challenges strong biosecurity is the only means.

Socioeconomic impact:

Mr Nath 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 he enhanced his knowledge and skill in poultry rearing particularly *Kamrupa* and inclined to take poultry farming as livelihood security with *Kamrupa* bird .More than that the earned almost a handsome profit like a salary and this

prevent his outflow mind to move from rural area to urban society in search of job

Backyard poultry farming specially with Narmdanidhi (A dual purpose color chicken variety)

Name of the farmer/ Entrepreneur: Shri Munna Shonker S/o Narayan Prasad Shanker

Address with phone no. and email: Village- Kheri, Tehsil- Panagar, District- Jabalpur, Phone no.

Background of the farmer: Shri Munna Shonkar, age 56 years, son of late shri Narayan Prasad shanker village kheri, Tehsil panagar Dist. Jabalpur. He blessed with two son shri Neeraj (28 years) and Shishir (22years) educated only upto middle school (8th class). He completed his education upto 8th class. In earlier days of his life He don't have any land, shop, business etc. as direct source of income, for earning of bread and butter he had to do work on daily basis on lands of other as labour /daily wager.

Initiative taken by the farmer: He came to AICRP center Jabalpur for purchasing bird for consumption purpose, on that day he visited poultry farm and decided to adopt poultry farming as business. After that he visited with faculty member of center and inquired about poultry business, center was ready to help him and technical guidance was given to him. Initially his business was started as selling of culled bird which he purchases now and then from the center. He was regular buyer of those birds and he earns money by selling those culled bird to on bicycle in nearby area of Jabalpur city. Later he continuously involved in this business and expands this business into large scale like selling of chicks and eggs of birds.

Details of breed/Variety reared: Narmdanidhi is the suitable commercial bird under all rearing systems. Birds mature at 162 days of age and produce more than 235 eggs in intensive, 205 eggs in semi intensive and 178 eggs annually in free range system.

Scientific intervention provided by institute/ center/KVK/ A.H. Department (Training, Inputs, etc.): he attended the scientific poultry farming training conducted by the center. Technical and scientific knowledge was given to him whenever required.

Achievements: He owned land of ½ acre of worth Rs. 6 lakh. Constructed 2 shed of 25'x50' and 15'x40. He has also small chicken center for slaughter of birds and chicken sold as dressed birds. He also constructed one shed for keeping adult birds for sale as well as for production of eggs. He has having second hand TVS two wheeler. His monthly income from poultry business is Rs. 25000 to 30000/ month by selling of chicks, eggs and dressed birds.

Socioeconomic impact: He has good reputation in society. He is also role model of other unemployed youth and landless laborers. He also inspire to other member of his family and to other community persons.

Successful hatchery unit

Smt. Jyoti Thantharate a women farmers of village Suhagi, dist. Jabalpur who is running her hatchery unit successfully since last nine years and supplying the colored chicks to NGO's, tribal farmers and mother units of MP state Govt. still continuing this business. She has extended the parent stock Strength and constructed double store shed from profit of hatchery unit. Smt. Jyoti sold more than 1,20,000 chicks during the current year and earned more than Rs. 80,000 per month by sale of coloured chicks to farmers.

Journey Of An Emerging Poulty Preneur Using Narmdanidhi (A Dual Purpose Color Chicken Variety)

Name of the farmer/ Entrepreneur:

Shri Varun Kumar Sonker S/o Late Sh. Ashok Kumar Sonkar

Address with phone no. and email:

House No. - 1073, Belbagh Thana, District-Jabalpur-482001, M.P. Phone no.-9399892453

Background of the farmer:

Shri Varun Kumar Sonkar, age 34 years living with mother and elder sister in his family. He completed his graduation in 2010. After graduation he was preparing for competitive exam and working in a mobile company as a part time job to earn bread and butter for his family.

Initiative taken by the farmer:

He visited to a farmer fair during his school life along with his elder brother organized by College of Veterinary Science & AH., Jabalpur in 2009. Thereafter, in 2015, he came to the AICRP center Jabalpur to discuss the prospects and challenges of poultry farming. After thinking for a while, he decided to adopt poultry farming as a business. He resigned from his job and started poultry farming at a very small scale. Initially he purchased only 50 chicks of Dual purpose Coloured bird from AICRP, Jabalpur. He reared the birds up to adult stage and sold live birds to local market. Thereafter, he constructed a small poultry shed using profit earned from sale of birds. He is searching a land to expand his business. Currently he is rearing regular batches of *NarmadaNidhi* chicks and earning approximate Rs. 15000-18000 in a duration of 3 months.

Details of breed/Variety reared:

Narmdanidhi is the suitable commercial bird under all rearing systems. Attained 12 week body weight of 1200-1300 g under intensive system of 900-1000g under semi-intensive/ free range system. Birds mature at 168-170 days of age and produce more than 235 eggs in intensive, 200 eggs in semi intensive and 170 eggs annually in free range system.

Scientific intervention provided by institute/ center/KVK/ A.H. Department (Training, Inputs, etc.):

He attended the scientific poultry farming training conducted by the center. Technical and scientific knowledge was given to him whenever required.

Achievements:

After establishing his poultry farm, he resigned from his part time job and become self-employed. In addition his family members also getting experience of poultry farming. He constructed two small sheds of 15'x 18 and 15'x 10'. He is searching a land to expand his business. He has purchased a two wheeler. His monthly income from poultry business is Rs. 5000-6000 per month by selling of adult birds.

Socioeconomic impact:

He has attained a respectable position among his family, friends and society. He has become a role model for unemployed educated youth. He has also inspired his brother to adopt the poultry farming and consequently his brother is also doing profitable poultry farming.

Success stories of farmers from Bihar

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 has provided regular technical support about backyard poultry farming. He sold the birds with the good profit and motivated to start the business at larger scale. Presently, he has a farm having 800 *Vanaraja* birds. He getting Rs. 10,000/= per month by sale of egg and birds. He is satisfying with this venture and has planned to further extend their flock size in near future. This successful venture has created positive sentiments among others rural youths. Twelve more youth from same village have been approaches to 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.

Fig 1. Raju Kumar Singh, of village Lakhani showing his backyard poultry farm

Sri. 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 his rearing 700 *Vanaraja* in his farm. His getting about 4000-5000/= per month by selling of grower chicks to the local venders. 15 persons of the area has started Vanraja rearing after seen the success.

Rudra Deo Mahto a Tharu tribes of village Govardhana, Ramnagar Block of West Champaran district started the 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=00 and bought 500 day old chicks from PSP Patna Centre. At present he is selling eggs @ 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 7 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 story of Mr. Hamjen from Nagaland

In Nagaland, there is high demand of poultry meat and eggs especially of *Vanaraja* and *Srinidhi* birds. Now, *Vanaraja* and Srindhi birds are household name in the remotest part of the state. This was possible due to the consistent efforts of ICAR-Poultry Seed Project, ICAR Nagaland Centre since its inception. The ICAR-PSP Centre has produced around ten lakhs chicks of these birds and supplied to around ten thousand tribal farmers of Nagaland and other states. There is almost demand of 200000 to 30000 chicks per month in Nagaland. This translates to almost 2.5 lakhs to 3.0 lakhs chicks per annum. However, the capacity of ICAR-PSP at Nagaland Centre is only 1.0 to 1.5 lakhs. Also tribal farmers from remote regions are not able to take chicks regularly because of transportation cost. Therefore, to augment the

supply of chicks, young educated youths were motivated during regular training programme on poultry.

Mr. Hamjen, a Kachari tribal farmers aged 28 years from Doyapur village, Dhansiri block came forward to start a hatchery at his farm. He was provided with training on egg storage, disinfection, candling, hatchery management and chicks production at ICAR Nagaland Centre. He was hand-holded in liaison with KVK Dimapur and linked with supplier of small hatchery. He purchased small capacity incubator (600 egg capacity) with his own fund (Rs.45000/-). Team of ICAR Nagaland Centre visited his farm and operationalized his incubator. After that ICAR-PSP, ICAR Nagaland Centre has provided him fertile eggs in two batches under TSP component of PSP. He has successfully hatched out the chicks and sold in the market at the rate of Rs.50/ per day old chicks. By putting 600 eggs he is getting 520 to 550 chicks in one batch and therefore earning Rs.25000/- to Rs.30000/- in one batch. Now, he is highly motivated and contacted the commercial egg suppliers for getting eggs. But, he preferred to raise Srindhi birds as these are high layers. Now he has planned to raise his own parent stock and produce chicks for other farmers in his village. He is fulfilling the need of his village. He has shown the success to his fellow farmers despite several odds. In this way, demand of improved germplasm in the remote villages can be fulfilled. His model can be replicated in other districts also.

Mr.Hamjen with his incubator and hatched out chicks

Success story of a farmer from Goa

Name of the farmer/entrepreneur: Mrs. Annete Especiosa Nunes

Title: The Nune's poultry farm

Address details: House number-0/6, Near Muslim Daragha, Opposite to ICAR CCARI, Ella, Old Goa, Phone number: 9822134474

Initiative taken by the farmer: She started with 15 turkeys initially during Christmas time and later expanded with ducks, chicken, guinea fowls and geeses. The birds were raised in different batches and demand increased during important festivities. Presently there are more than 200 poultry birds per batch including guinea fowls. Now Mrs Nunes started her own poultry retail unit for dressing poultry birds to earn more profit. She is preparing poultry feed by using a small pelleting machine. The byproducts of bakery industry also incorporated into the feed to reduce feed cost. She goes for value addition of the products like preparation of salted sausages and nuggets etc. She marketed her birds as Nunes birds and her products are always on demand.

Details of Breed/Variety reared: Backyard poultry varieties: *Vanaraja*/ *Gramapriya*/ *Srinidhi* = 150 numbers; Ducks: White Pekin/ Kuttanad/ Muscovy = 20 nos; Turkey = 25 nos; Guinea fowl = 10 nos and Geese = 5-7 nos.

Scientific Intervention provided by institute under Poultry Seed Project: She procured chicks of 6-8 weeks of age and ducklings from our institute. Her farm labours visited our institute units and attended training. She also trained by our institute only in scientific backyard poultry farming previously. She always avails the help of ICAR-CCARI, Goa as and when required.

Achievements: She earns nearly Rs 50,000 - 70,000 per annum after deducting the investments as revealed by her. Her story has been covered in many local newspapers as an example to boost farming activities in Goa. She recalled one goes by the title "Women in mens world" and others.

Socioeconomic impact: She is an inspiration to many women farmers as she single handedly managing the poultry and other livestock farms profitably.

Success story of a farmer of Tamilnadu

Mrs. M. Manohari, W/o Mr. Manivannan aged 27 residing at Kannarapettai village, Mannakudi Taluk of Tiruvarur District in Tamil Nadu is a small farmer and he rears *Gramapriya* and *Vanaraja* for subsidiary income generation. She learned about production potential of *Vanaraja* and *Gramapriya* and supply of the germplasm from College of Poultry Production and Management, Hosur under ICAR – Poultry Seed Project. She underwent formal three-day 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 native chicken.

The farmer purchased 100 *Gramapriya* chicks from CPPM, Hosur through FTC, Tiruvarur. She reared the chicks under Intensive system, up to 60 days after which she reared the chicks under free range system. The farmer sells the male birds for meat purpose at the rate of Rs. 180 per kg live weight and keeps the layer chicken for egg production. The eggs are being sold directly to the consumers at the rate of Rs. 13.00 per eggs. The farmer gets subsidiary income of Rs. about Rs. 10,000 – Rs. 12,000 per month. She plans to purchases *Gramapriya* chicks regularly from PSP Centre, CPPM, Hosur through FTC, Tiruvarur, once in four months. The farmer profoundly thanked ICAR-Poultry Seed Project and TANUVAS for the seed supply and supply of technical know-how to him.

Success story of a farmer from Andaman and Nicobar Islands

Name of the Entrepreneur: Smti. Meenakshi; Location: Indiranagar

What was the situation when he started this practice/ production/technology: She started backyard poultry in 2014. She was rearing *vanaraja* with unit size of 20-30 nos and was having native birds of 50-60 nos. At 6 months of age, 10-15 birds will be consumed at home and 10-15 Birds were dying. Once in every 6 months, she used to purchase *vanaraja* chicks (20-30 nos.) and ducks. At the age of egg laying, all birds died due to mortality.

What was the problem/constraints they faced: She could not sale birds because of huge loss of birds due to diseases. She had no knowledge on marketing of eggs and birds and on treatment of diseased birds. She decided to close the poultry farming.

How scientists/staff of ICAR-CIARI/KVK guided She thought of joining training to get knowledge on poultry rearing. She joined training at CIARI for one month. During the training, she was taught on how to feed birds, to vaccinate poultry, what are all the diseases in poultry, how to treat with herbal plants, how to do brooding, how to do litter management and how to do disinfection.

What is improvement at present: From march 2020, she started practicing as per guidance under the project. She is using Herbal with vitex, neem, halti continuously from day old of birds. Birds are healthy. Disease outbreak was there in our area. But still, only 15 nos birds died. Vaccines are being given. She could sell 148 birds (*vanaraja*.) during lockdown with a total net income of Rs. 64000/- in six months duration.

Success story of a farmer from Jammu and Kashmir

Vanaraja Poultry Farming Under Hort Poultry Integrated Model

Mr. Mohammad Iqbal, a native of Checkdena, Harwan, Kashmir, completed his education up to the 12th class. After being unemployed for a long time, he opened a broiler retail shop in his neighborhood a few years ago and became involved in rearing *Vanaraja* in his backyard last year. The farmer was provided 200 day old chicks from ICAR- Poultry Seed Project-SKUAST-K, and the birds were raised in an intensive system for the first 6 weeks. After that, he practised semi-intensive system of rearing in which the chicks were reared in open cherry orchard of 4 kanal land besides providing them feed in morning and shelter in evening, leaving the birds to fend for themselves. Since manpower was required to follow the birds and protect them from predator attacks, he taught a dog to guard the birds all day. According to the farmer, these measures aided him greatly because the birds were healthy and were out for the whole day, lowering the cost of production by a significant amount on feed and upkeep. 110 females and 63 males out of 200 birds lived for up to 5.5 months. The farmer sold 38 extra males at @ 260/kg with an average weight of 1.5 kg each for Rs.14820, which he further invested to buy feed.

He received 40 eggs per day from 110 hens at the end of the seventh month, which he consumed at home and also sold for Rs.7 each, resulting in a profit of Rs.8575. During this laying process, he fed the flock with 3.5 kg of commercial feed daily in the morning, and the majority of the day, the birds were left to feed themselves in the cherry orchard. In order to increase egg production, he sought advice from SKUAST-K Scientists, who recommended mineral & multi-vitamin supplementation. After 10 days of supplementation, the farmer's egg yield increased dramatically from 43 to 105 eggs a day from 110 hens. The production was persistent for 1.5 month and the eggs collected where consumed by the farmer family and a portion of them was sold for an amount Rs.11450. With the emergence of bird flu cases in J&K and neighboring states the farmer was forced to sell 80 hens along with 30 cocks @ 250/ kg earning him a revenue of Rs.46750. Encouraged with his own progress he has booked a new batch of 300 *Vanaraja* chicks from Poultry Seed Project, SKUAST-K for the year 2021.

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

7th April, 2021 at DPR, Hyderabad
(Virtual mode)

Inaugural Session

Chairman : Dr. B.N.Tripathi, DDG (AS), ICAR, New Delhi

Co-Chairman : Dr. V.K.Saxena, ADG (AP&B), ICAR, New Delhi
Dr. R. N. Chatterjee, Director, ICAR-DPR, Hyderabad

The Annual Review Meeting of AICRP on Poultry Breeding and Poultry Seed Project was organized virtually by ICAR-DPR, Hyderabad on 7th April 2021 through online to evaluate the progress made during 2019-2020. DDG (AS), Dr.V.K.Saxena, ADG, (AP&B), Director, DPR, Director, NBAGR, Dr.Vineet Bhasin, PS, ICAR, Scientists of DPR, PIs of 12 AICRP and 12 PSP Centres participated in the online meeting.

The Inaugural session was chaired by Dr. B.N.Tripathi, DDG (AS), ICAR and Co-Chaired by Dr. V.K.Saxena, ADG (AP&B), ICAR and Dr. R. N. Chatterjee, Director, ICAR-DPR. Dr. S.V.Rama Rao, Incharge, PSP & Principal Scientist, ICAR-DPR welcomed all the dignitaries and principal investigators of different units.

Dr. R. N. Chatterjee, Director, ICAR-DPR, Hyderabad during his address, welcomed the dignitaries and centre incharges and highlighted the achievements and contributions of the AICRP on Poultry Breeding and Poultry Seed Project.

Dr.V.K.Saxena ADG (AP&B) narrated the importance of identification, characterization and registration of native chicken germplasm and directed to strengthen the native chicken component in the next plan period. Dr. Saxena informed that it is proposed to merge the Poultry seed project with AICRP on Poultry Breeding during the next plan.

Dr. V. Bhasin, Pr. Scientist, AS Division, ICAR informed that the impact of AICRP-PB was earlier evaluated by a third party and showed a positive impact and the addition of rural component resulted in the increased outcome of the scheme. Dr. Bhasin stressed the need of incorporating centres covering hilly regions such as Jammu and Leh to study the important local germplasm and to develop location specific varieties.

Dr B.N.Tripathi, DDG (AS) welcomed the delegates on behalf of the Council and complemented the progress made by different centres. He stressed the need for association with DAHD and State Animal Husbandry departments to increase the germplasm supply by providing the parent's lines of important rural backyard varieties. DDG(AS) suggested to explore the possibility of utilizing the DNA chip in the selection program to increase the genetic gain.

Dr. R. N. Chatterjee, Director, ICAR-DPR presented the PC Report of AICRP on Poultry Breeding and Poultry Seed Project for the year 2019-20 and action taken report on the recommendations of last annual review meeting. He highlighted the significant achievements made during 50 years of AICRP-PB.

Dr. R. N. Chatterjee, Director, ICAR-DPR also presented the future action plan for the next five years and informed that the technical program will be reoriented towards conservation and improvement of native breeds, development of location specific varieties and propagation of native and improved germplasm. He also directed to compile the significant achievements made during 50 years of AICRP-PB. DDG (AS) noted that in few centres there was an increase in germplasm supply but a corresponding increase in revenue was not observed and instructed the PIs to review and revise the sale price of germplasm.

Dr.V.K.Saxena, ADG(AP&B) suggested that socio-economic analysis and impact analysis is to be done by five AICRP centres developed the improved chicken varieties and all seed centres. He directed all the PIs to publish and submit the success stories at regular interval.

DDG(AS) interacted with all the PIs of AICRP-PB and PSP centres and enquired about progress made and problem faced if any. Progress made by each centre of ACIRP-PB and PSP was discussed and suitable recommendation and action plans were provided to the PIs. DDG(AS) directed all the centres to make efforts to increase the germplasm supply to increase the population and contribution of Backyard Poultry in India. DDG(AS) highlighted the need of developing new lines/varieties with fortification. DDG(AS) also suggested discontinuing the non-performing centres. He also directed the PIs to give importance to poultry health to maximize the production of backyard chicken and report the disease incidence and mortality in farm and field units.

Dr. U. Rajkumar, Incharge, AICRP-PB & Principal Scientist, ICAR-DPR proposed the vote of thanks.

Recommendations

1. All the PIs should get farmer's feedback and prepare a detailed impact analysis report.
2. All the PIs should provide success stories, output and outcome details in the annual report.
3. All the Centres should make efforts to increase the germplasm supply.
4. All Centres should revise the sale price of different germplasm and intimate to the coordinating unit.
5. The cost of chicks distributed under the TSP/STC and SCSP/DAPSC program should be booked under TSP/SCSP head and added to the revenue of the project

Action Taken Report on the recommendations of AICRP and PSP annual review meeting 7th April, 2021 at DPR, Hyderabad

Sl No	Recommendations	Action Taken
1	All the PIs should get farmer's feedback and prepare a detailed impact analysis report	Complied with. Some centers provided the details
2	All the PIs should provide success stories, output and outcome details in the annual report	Complied with. Some centers provided the details
3	All the Centres should make efforts to increase the germplasm supply	Some centres need improvement
4	All Centres should revise the sale price of different germplasm and intimate to the coordinating unit.	Complied with
5	The cost of chicks distributed under the TSP/STC and SCSP/DAP-SC program should be booked under TSP/SCSP head and added to the revenue of the project	Complied with

Publications

AICRP on Poultry Breeding

Atkare, S.S., Chouhan, L. , Goyal, G., Shinde A.S. and Shekhawat, L.S. (2020). Effect of protein levels, ascorbic acid and their interaction on performance of colour hen during pre and post summer periods. Int. J. Curr. Microbiology App. Sci, 9(11): 645-649.

Champati, A., Samal, L., Behura, N.C., Muduli, S. and Popalghat, H.K. (2020). Laying performance and egg quality traits of *Hansli* × CSML birds under different rearing systems. Journal of Entomology and Zoology Studies, 8(4): 37-39.

Champati, A., Samal, L., Behura, N.C., Pati, P.K., Muduli, S. and Popalghat, H.K. (2020). Carcass traits and meat composition of *Hansli* × CSML birds under intensive and semi-intensive rearing systems. Journal of Animal Research, 10(6): 1051-1055.

Chouhan, L. Atkare S.S., Shinde, A.S. Joshi, S.K. and Shekhawat, L.S. (2020). Performance of coloured broilers with and without enzymes supplementation fed SFC included varying crude fibre diets. Int. J. Curr. Microbiology App. Sci, 9(11): 650-655.

Dahariya, N., Sathapathy, S., Mishra, U.K., Patra, R., Dehury, S., Joshi, S.K., Sahu, S.K. and Samal, L. (2020). Gross morphological and biometrical studies on the spleen in various chicken genotypes. Journal of Entomology and Zoology Studies, 8(5): 626-628.

Dahariya, N., Sathapathy, S., Mishra, U.K., Patra, R., Joshi, S.K., Sahu, S.K., Samal, L. and Jena, B. (2020). Gross morphological and biometrical studies on the bursa of Fabricius in various chicken genotypes. Journal of Entomology and Zoology Studies, 8(5): 623-625.

Dahariya, N., Sathapathy, S., Patra, R., Mishra, U.K., Sahu, S.K., Samal, L., Jena, B. and Joshi, S.K. (2020). Age wise histological studies on the major lymphoid organs in various chicken genotypes. Journal of Animal research, 10(5): 811-819.

Dahariya, N., Sathapathy, S., Patra, R., Sahu, S.K., Samal, L. and Joshi, S.K. (2020). Histo-chemical studies on the major lymphoid organs in various chicken genotypes. International Journal of Livestock Research, 10 (12): 137-142.

Dinesh K, Sankhyan V, Thakur YP, Kumar R and Bhardwaj N. (2020). Phenotypic Time Trend in Performance Evaluation of *Dahlem Red* Chicken under Intensive Management in Himachal Pradesh. Journal of Animal Research10 (3): 417-422.

Karoriya, A. K., Jain, A. Chouhan, L., Mehta, M.K. and Kumar, R.(2020). Effect of Dietary Supplementation of Germinated Maize on Hematological Parameters of *Kadaknath* Layers. Acta Scientific Veterinary Sciences, 2:39-44.

Patel AB, NJ Bhagora, FP Savaliya, RK Mishra and VD Lonkar (2020) Performance of *Ankleshwar* Chicken Reared under Intensive Management System in Gujarat, Ind J of Vet Sci and Biotech ,15(4): 47-50.

Thakur R, Sankhyan V, Kumar R and Mankotia BS. (2020). Demonstration on *Himsamridhi* variety of chicken under rural poultry production in District Kangra, Himachal Pradesh. Journal of Krishi Vigyan 9(1): 351-54.

Tripathi, S. B., Jatav, G.P., Malik , A. A., Joshi , S. Singh , V. K. Negi , M. S. Chouhan , L. & Sharma, S.S.(2021). AFLP markers based genetic diversity and population structure analysis of *Kadaknath*: an indigenous black meat poultry breed of India. Animal Biotchnology,10:1-11.

Vinay Singh, Chandra Deo, Sunil Doley, A. B. Mandal, S. K. Bhanja and B. K. Kandpal (2020). Effect of Feeding Rice Based Brewers Dried Grain on Immune Response and Haemto-Biochemical Parameters of Broiler Chickens. Indian Journal of Hill farming.

Addresses

AICRP-PB Centres

Dr. Beena C Joseph,
I/C AICRP on Poultry Breeding, Department of Poultry Science, College of Veterinary & Animal Sciences,
Kerala Veterinary & Animal Sci. University,
Mannuthy, Thrissur - 680651, Kerala.
email : beenajoseph@kvasu.ac.in
Phone : 9495535500

Dr. F.P. Savaliya,
I/C AICRP on Poultry Breeding,
Principal Scientist & Head, Poultry Complex,
College of Veterinary Science & Animal Husbandry,
Anand Agricultural University, Anand - 388110, Gujarat.
email : fpsavaliya@gmail.com
Phone : 9537913412

Dr. C.S. Nagaraja,
I/C AICRP on Poultry Breeding, Professor and Head,
Veterinary College Campus,
Karnataka Veterinary Animal and Fishery Science University (KVAFSU),
Hebbal, Bangalore - 560024, Karnataka.
email : drcsnagaraj@gmail.com
Phone : 9448904176

Dr. Shakti Kant Dash,
I/C AICRP on Poultry Breeding,
Assistant Professor (AG&B),
Department of Animal Genetics and Breeding College of Veterinary Sciences (COVS),
Guru Anand Dev Veterinary and Animal Sciences University, Ludhiana - 141004, Punjab.
email : shaktikant07@gmail.com
Phone : 8146549402

Dr. Simmi Tomar,
Principal Scientist, AG&B Division,
ICAR-Central Avian Research Institute,
Izatnagar - 243122, Bareilly, U.P
email : simmi1968@gmail.com,
simmitomar@rediffmail.com
Phone : 7906361577

Dr. S.K. Dash,
I/C AICRP on Poultry Breeding, Head, Professor
Department of Animal Breeding and Genetics
Orissa Veterinary College,
Orissa University of Agriculture & Technology,
Bhubaneshwar – 751003, Odisha
email : susantdash46@gmail.com
Phone : 9437211087

Dr. Vinay Kumar,
I/C AICRP on Poultry Breeding, Scientist,
ICAR Research complex for N.E.H. Region,
Tripura Centre, Lembucherra - 799210, Tripura (West).
email : vinvet1@gmail.com
Phone : 8974609227

Dr. S.S. Atkare,
I/C AICRP on Poultry Breeding, Professor,
Department of Poultry Science,
College of Veterinary Sc. & Animal Husbandry,
Nanaji Deshmukh Veterinary Science University,
Adhartal, Jabalpur-482004 (MP).
email : sudhirsatkare@gmail.com
Phone : 9406760109

Dr. Niranjan Kalita,
I/C AICRP on Poultry Breeding,
Professor and Head, Department of Poultry Science,
College of Veterinary Science,
Assam Agricultural University, Khanapara,
Guwahati-781022, Assam.
email : niranjankalita@gmail.com
Phone : 7086077669

Dr. Sushil Prasad,
I/C AICRP on Poultry Breeding,
University Professor and Head,
Department of Livestock production and Management,
Faculty of Veterinary Science & Animal Husbandry,
Birsa Agricultural University, Kanke, Ranchi - 834006.
Jharkand.
email : sushil.poullpm@yahoo.co.in.
Phone : 943159424

Dr. Varun Sankhyan
I/C AICRP on Poultry Breeding,
Assistant Professor, Department of Animal Breeding,
College of Veterinary & Animal Sciences,
CSK HPKV, Kangra, Palampur -176 062, HP.
email : sankhyan@gmail.com
Phone : 9418534054

Dr. S. Misra,
I/C AICRP on Poultry Breeding,
University Professor and Head,
Department of Livestock production,
Rajasthan College of Agriculture, MPUAT,
Udaipur - 313001, Rajasthan.
email : drsiddharthamishra@gmail.com
Phone : 9414978472

PSP Centres

Dr. A.A. Khan

PI, ICAR-Poultry Seed Project, Associate Professor,
Dept of LPM, SKUAST - Kashmir,
Shuhama Campus, Alusteng, Srinagar 190006 J&K.
email : azmatalamkhan@gmail.com.
Phone : 9796936363

Dr. Pankaj Kumar,

PI, ICAR-Poultry Seed Project, Associate Professor,
Dept. of Animal Genetics and Breeding,
Bihar Veterinary College, BASU, Patna - 848 125, Bihar.
email : drpankajvet69@gmail.com.
Phone : 9835676663

Prof. Ajit Kr. Sahoo,

Dean (Actg.), PI, ICAR-Poultry Seed Project,
Faculty of Veterinary and Animal Sciences,
West Bengal University of Animal & Fishery Sciences. 37
Belgachia Road, Kolkata-700037.
email : profaksahoo@gmail.com
Phone : 9432406478.

Dr. R.K. Avasthe,

Joint Director, PI, ICAR-Poultry Seed Project,
ICAR-National Organic Farming Research Institute
(ICAR- NOFRI), Tadong, Gangtok - 737102, Sikkim.
email : jdsikkim.icar@gmail.com.
Phone : 9434184200

Dr. Mahak Singh,

Scientist & PI, ICAR-Poultry Seed Project,
ICAR RC for NEH Region Nagaland Centre,
Medziphema - 797 106, Nagaland.
email : mahaksinghivri@gmail.com
Phoen : 9474939889

Dr. Megachandra Singh,

Joint Director, PI, ICAR-Poultry Seed Project,
ICAR RC for NEH Region Manipur Centre,
Lamphelpat, Imphal - 795 004.
email : Jdmn.icar@nic.in.
Phone : 9436027223

Dr. P. Shamsudeen,

Professor & PI, ICAR-Poultry Seed Project,
College of Poultry Production and Management,
Mathigiri, Hosur - 635 110 Tamilnadu.
email : shams_phd@rediffmail.com.
Phone : 9486242799

Dr. T.Sujatha,

Senior Scientist & PI, ICAR-Poultry Seed Project,
Central Island Agricultural Research Institute (CIARI),
Portblair, A&N Islands 744101.
email : drsujathaars@rediffmail.com.
Phone : 9531818976

Dr. Nibedita Nayak,

Scientist & PI, ICAR-Poultry Seed Project, ICAR Research complex for Goa,
Old Goa, Panaji, Goa 403 402.
email : drnibeditavet@gmail.com.
Phone : 7252925732

Dr. Sunil Doley,

Principal Scientist & PI, ICAR-Poultry Seed Project,
ICAR Research Complex for NEH Region, Umroi Road,
Umiam-793103, Meghalaya.
email : doleysunil@yahoo.com.
Phone : 9436166531

Dr. P. Amareswari,

Senior Scientist (AGB), PI, ICAR-Poultry Seed Project,
Livestock Research Station, Mamnoor,
Warangal - 506166.
email : amarvety@yahoo.com.
Phone : 9440566429

Dr. S. Shakila,

Professor & PI, ICAR-Poultry Seed Project,
Dept of Poultry Science College of Vety. Sciences,
Sri Venkateswara Veterinary University, Tirupati.
email : drshakilas@yahoo.co.in.
Phone : 9440167225

Improved variety in farmer's backyard at Goa

Vanaraja birds in farmer's field at Srinagar

Brooding of chicks at Goa centre

Kachari tribal farmer incubating eggs in his farm at Nagaland

Input distribution at Srinagar centre

Chicks hatched at farmer's hatchery at Nagaland

Cage rearing of birds at Goa

Improved backyard chickens at Sikkim centre

Training to tribal farmers at Umiam Centre

Women farmer with *Vanaraja* birds at Sikkim

Vanaraja birds at Sikkim farmer's backyard

Improved birds with night shelter at Sikkim

Ankleshwar native chicken at Anand centre

Bird distribution under SCSP Program at Bengaluru centre

BND cross birds at farmer's field at Agartala centre

Chick feed for distribution to SC farmers at Bengaluru centre

Daothigir birds at Guwahati centre

Farmers gathering during chick distribution programme at Agartala centre

Himsamridhi birds at farmer's field

Input distribution to a tribal farmer at Palampur centre

Kamrupa birds in famer's field

Mewari birds at Udaipur centre

Night shelter at high hills (Kinnaur), Palampur centre

PB-2 hens at Bengaluru centre

Pratapdhan birds in the field

Punjab Brown bird at Ludhiana centre

Tellichery birds reared at Mannuthy centre

Training to SC farmers given at Jabalpur centre

White Leghorn grower female birds at Mannuthy centre

White Leghorn grower male birds at Mannuthy centre

Input distribution to tribal farmers at Umiam centre

Training program on poultry farming at Srinagar centre


कुक्कुट अनुसंधान निदेशालय
DIRECTORATE OF POULTRY RESEARCH
RAJENDRANAGAR, HYDERABAD
प्रशासनिक एवं
प्रयोगशाला भवन
ADMINISTRATIVE CUM
LABORATORY BUILDING

भाकृअनुप - कुक्कुट अनुसंधान निदेशालय
ICAR-Directorate of Poultry Research
Rajendranagar, Hyderabad - 500 030, Telangana, India
Ph.: +91 (40) 2401 5651/7000/5652/8687 Fax : +91 (40) 24017002
email : pdpoult@nic.in website : www.pdonpoultry.org
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