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भेड़ सुधार नेटवर्क परियोजना
NETWORK PROJECT ON SHEEP IMPROVEMENT

वार्षिक प्रतिवेदन
ANNUAL REPORT
2014-15

भारतीय कृषि अनुसंधान परिषद्
केन्द्रीय भेड़ एवं ऊन अनुसंधान संस्थान
अविकानगर – 304 501 जिला–टोंक, राजस्थान
ICAR - Central Sheep and Wool Research Institute
Avikanagar - 304 501 District - Tonk, Rajasthan

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July, 2015

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PREFACE

The annual report of the Network Project on Sheep Improvement (NWPSI) for the period 01.04.2014 to 31.03.2015 has been compiled from annual progress reports obtained from six cooperating centres. The funds allocated by the council as revised budget estimate for the year 2014-15 are presented. I thank the P.I's / Unit Incharges for their valuable contributions. The sincere efforts made by all the associated scientists and staff of cooperating sheep units deserve a word of appreciation and I am highly thankful to every one of them.

I take this opportunity to express my sincere gratitude to Dr. K.M.L.Pathak, Deputy Director General (Animal Science), Dr. R.S.Gandhi, Assistant Director General (AP&B), Dr. Vineet Bhasin, Principal Scientist (AG&B) and staff of Animal Science Division, Indian Council of Agricultural Research for their keen interest and critical guidance in the project activities. Dr. Arun Kumar, Head (AGB), Dr. R.C.Sharma, Dr. S.S.Misra, Dr. G.R.Gowane, Dr. Ved Prakash, Dr.I.Chauhan and staff of Division of Animal Genetics and Breeding deserve deep appreciation for their help and guidance. Special thanks are due to Mr.R.K.Meena, Technical Officer, AGB Division for his assistance in maintenance of inventory.

My sincere thanks are due to Dr. S.M.K. Naqvi, Director, CSWRI and Project Coordinator (Sheep Breeding) for his guidance, continuous encouragement, overall monitoring and providing facilities for the PC Cell. I am thankful to CAO, FAO, DDO, staff of A&A, ADM-I, ADM-II and Purchase Section, CSWRI for their help in administration, fund management and remittance.
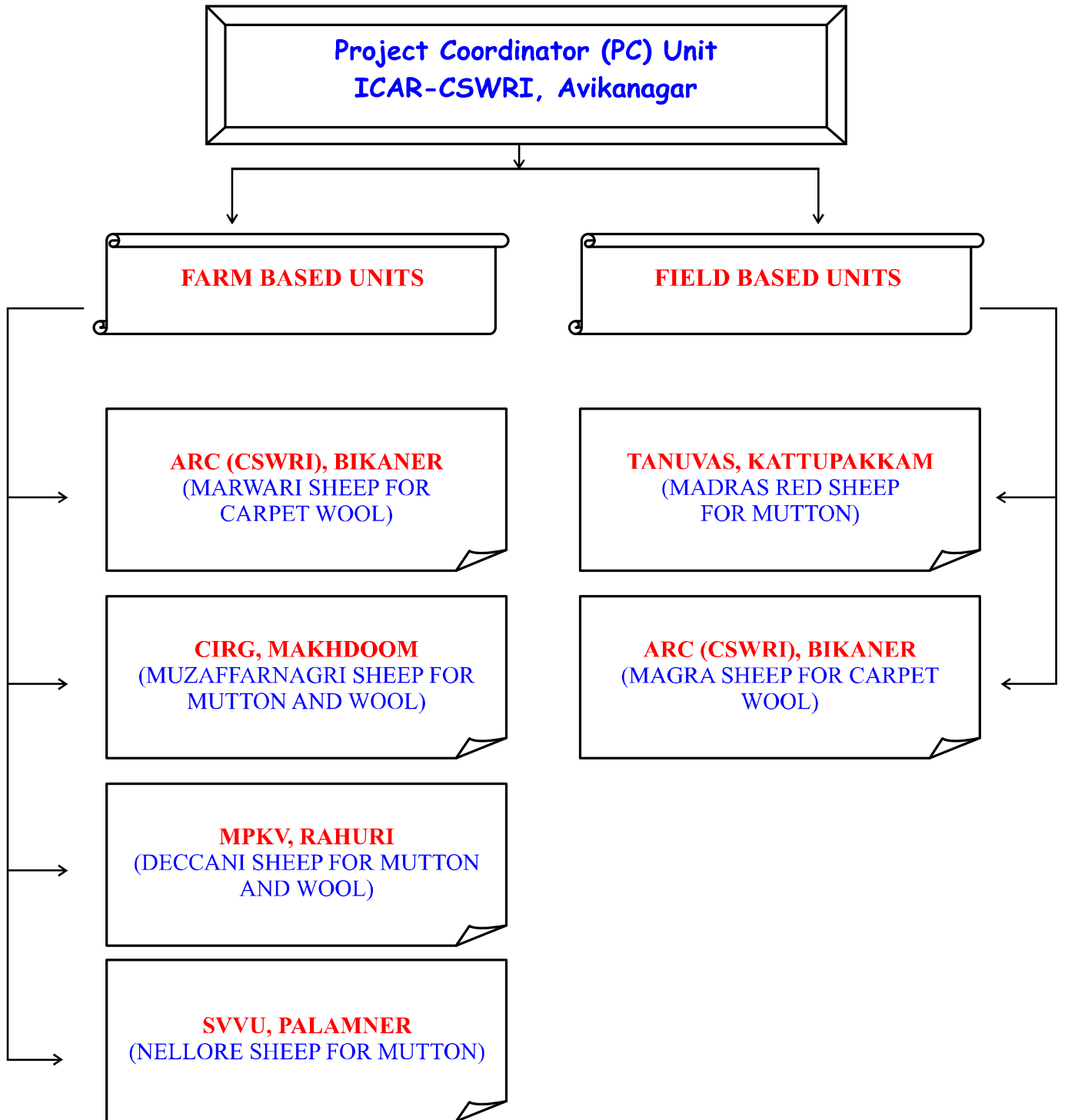
I express my sincere thanks to the Vice Chancellors/Directors, Directors of Research and Heads of Stations of various Agricultural/Veterinary Universities/Institutes and different centres for their active involvement in ensuring the smooth conduct of the project in their sheep unit.

(L. Leslie Leo Prince)
Incharge, PC Cell

Avikanagar
July, 2015

Network Project on Sheep Improvement

Project Coordinator (PC) Unit
ICAR-CSWRI, Avikanagar

FARM BASED UNITS

FIELD BASED UNITS

ARC (CSWRI), BIKANER
(MARWARI SHEEP FOR CARPET WOOL)

TANUVAS, KATTUPAKKAM
(MADRAS RED SHEEP FOR MUTTON)

CIRG, MAKHDOOM
(MUZAFFARNAGRI SHEEP FOR MUTTON AND WOOL)

ARC (CSWRI), BIKANER
(MAGRA SHEEP FOR CARPET WOOL)

MPKV, RAHURI
(DECCANI SHEEP FOR MUTTON AND WOOL)

SVVU, PALAMNER
(NELLORE SHEEP FOR MUTTON)

CONTENTS

SUMMARY

Network Project on Sheep Improvement (NWPSI) was initiated on 1.4.1990 for survey, evaluation and improvement of indigenous sheep breeds under native environment. All the centres of All India Coordinated Research Project on Sheep Breeding (AICRP SB) were converted into NWPSI Centres. Different breeds of sheep are being improved through selection and inter-se mating for improved wool and mutton production. The mandate of NWPSI is survey of indigenous sheep, their genetic evaluation and improvement. During 2014-15, there are six centres of NWPSI including four farm based units at ARC (CSWRI), Bikaner (Marwari, carpet wool), CIRG, Makhdoom (Muzaffarnagri, Dual type), MPKV, Rahuri (Deccani, Dual type) and SVVU, Palamner (Nellore, Mutton) and two field based units at TANUVAS, Kattupakkam (Madras Red, Mutton) and ARC (CSWRI), Bikaner (Magra, Carpet wool). Project Coordinating Cell is located at ICAR-CSWRI, Avikanagar.

The technical programme aims at improvement of indigenous sheep breeds under farm conditions where in the ram lambs are first ranked using selection index and selected rams are used for mating by the age of 18 months. Subsequently these rams are again evaluated based on their progeny performance and best 2-3 rams are selected and used for further breeding. Each field-based unit has four centres including a ram-rearing centre, covering a sheep population of about 1500 breedable ewes per centre. The superior male lambs are selected from the farmers' flocks on the basis of first six monthly greasy fleece yield and six month body weight in Magra sheep and on six month body weight basis in Madras Red sheep. Male lambs are initially identified at 3 month of age and are finally selected after first shearing/market weight. Unit wise results of the Network Project on Sheep Improvement are summarized below:

Marwari Unit, Arid Region Campus (CSWRI), Bikaner: The average birth, 3, 6, 9 and 12- month weights of 2014 born lambs were 3.19, 16.45, 23.03, 28.33 and 31.09 kg, respectively. The overall tupping and lambing on available basis were 97.54% and 87.15% respectively. The average fibre diameter, medullation and staple length were 37.28µ, 55.76% and 4.59 cm. Adult annual GFY was 1481 gm. The overall survivability was 97.70%. *A total of 77 Marwari rams and 28 ram lambs were sold to various agencies for sheep improvement programme.*

Muzaffarnagri Unit, CIRG, Makhdoom: Least square means for birth, 3, 6, 9 and 12- month weights of 2014 born lambs were 3.60, 17.03, 26.84, 33.34 and 38.34 kg, respectively. Tupping was 97.30 %. Lambing based on available and tupped was 88.3 % and 91.1 %, respectively. Average ewes' weight at first service, age at first service, age at first lambing and ewes' weight at lambing were 34.0 kg, 423 days, 578 days and 38.8 kg, respectively. Overall survivability of the flock was 97.18%. Adult annual GFY was 1293 gm. *A total of 125 rams were sold to various agencies for sheep improvement.*

Deccani Unit, MPKV, Rahuri: Average weight at birth, 3, 6, 9 and 12- month age of 2014 born Deccani lambs were 3.47, 16.13, 24.54, 25.83 and 28.69 kg, respectively. The tupping percentage was 97.12 while the lambing based on ewes available was 90.06%. Average ewes' age at first service, age at first lambing and ewes' weight at lambing were 476 days, 624 days and 34.2 kg, respectively. The overall survivability was 97.93 %. *Unit sold 36 Deccani rams and distributed 30 rams to the farmers/various agencies for sheep improvement programme.*

Nellore Unit, SVVU, LRS Palamner : The overall means for body weight at birth, 3, 6, 9 and 12- month for 2013-14 born Nellore lambs were 3.16, 14.01, 20.10, 25.21 and 29.01 kg, respectively. Body weight at birth, 3 and 6 months of 2014-15 born lambs were 3.01, 15.20 and 21.03 kg, respectively. The tupping was 95.21 %. Lambing based on ewes available and tupped was 84.13 % and 88.35 %, respectively. *During the year under report 70 Nellore rams were sold to different farmers for breed improvement programme.*

Madras Red Unit, TANUVAS, PGRIAS, Kattupakkam: A total of 11296 sheep available with 114 sheep farmers were registered covering 6090 breedable ewes. Overall mean body weights of Madras Red lambs born during 2013-14 for birth, 3, 6 and 12- month age were 2.58, 11.53, 15.59 and 20.53 kg, respectively. Birth and weaning weight of 2014-15 born lambs were 2.34 and 10.59 kg, respectively. About 85.50 per cent lambing was observed during the year. A total of 810 lambs were identified for performance recording. *A total of 27 newly purchased rams were distributed and 58 ram were redistributed to registered farmers at various centres.*

Magra Unit, Arid Region Campus (CSWRI), Bikaner: A total of 8212 sheep available with 100 sheep farmers were registered covering 4493 breedable ewes. Overall mean body weight of lambs born during 2014-15 for birth, 3, 6 and 12- month age were 2.50, 16.30, 23.20 and 30.30 kg, respectively. About 79.72 per cent lambing was observed during the year. A total of 98 rams were distributed to registered farmers at various centres.

Annual Review Meeting to review the performance made during 2013-14 was held at NASC Complex, New Delhi on 29-30th, October, 2014 under the chairmanship of Dr. K.M.L.Pathak, DDG(AS). Dr. R.S.Gandhi, ADG(AP&B), Dr. S.M.K.Naqvi, Director, CSWRI, Dr. Vineet Bhasin, Principal Scientist, ICAR, Dr. Arun Kumar, Head (AGB) and PIs/Co-PIs from six sheep units and scientists from CSWRI participated in the meeting. Progresses made by the six cooperating units were reviewed and suitable suggestions and recommendations were provided for further improvement in the programme.

Training program on "Demonstration of Oestrous Synchronization and Artificial Insemination (AI) in Sheep" for Scientists/ Professors/ PIs/ Staff of NWPSI sheep units was conducted during 20-26th August, 2014 at CSWRI, Avikanagar. Dr. Suresh Honnappagol, Animal Husbandry Commissioner, Department of Animal Husbandry, Dairying and Fisheries, presided over as chief guest during the inaugural function. Participants from Nellore, Madras Red, Deccani and Marwari units of NWPSI and Mecheri, Mandya and Malpura units of MSSP participated in the hand on training. Prof. (Dr.) M. L. Madan, Former DDG, ICAR presided over as the chief guest during the valedictory function and distributed the certificates.

सारांश

देशी वातावरण के अन्तर्गत स्थानीय भेड़ों की नस्लों का सर्वेक्षण, मूल्याँकन एवं सुधार हेतु दिनांक 01.04.1990 को भेड़ सुधार पर नेटवर्क परियोजना (NWPSI) प्रारम्भ की गई। भेड़ प्रजनन पर अखिल भारतीय समन्वय परियोजनाओं (AICRP-SB) के सभी केन्द्र NWPSI केन्द्रों में परिवर्तित किए गए। ऊन एवं मांस उत्पादन के लिए विभिन्न भेड़ों की नस्लों में चयन एवं अन्तः समागम से सुधार किया जा रहा है। NWPSI का अधिदेश स्थानीय भेड़ों का सर्वेक्षण, उनका आनुवांशिक मूल्याँकन एवं सुधार करना है। वर्ष 2014—15 के दौरान NWSPI के छः केन्द्र, जिनमें ए.आर.सी. (सी.एस.डब्लू.आर.आई), बीकानेर (मारवाड़ी, गलीचा ऊन), सी.आई. आर.जी., मखदूम (मुजफ्फरनगरी, द्विउद्देशीय), एम.पी.के.वी., राहुरी (डेक्कनी, द्विउद्देशीय) एवं एस.वी.वी.यू., पालमनेर (नेल्लोर, मांस) वाली फार्म आधारित इकाईयाँ एवं ए.आर.सी. (सी.एस.डब्लू.आर.आई), बीकानेर (मगरा, गलीचा ऊन) एवं टी.ए.एन.यू.वी.ए. एस, कट्टूपक्कम (मद्रास रेड़, मांस) प्रक्षेत्र आधारित इकाईयाँ शामिल हैं। प्रयोजना समन्वयक सेल आई.सी.ए.आर—सी.एस.डब्लू. आर.आई. अविकानगर में स्थित है।

तकनीकी कार्यक्रम का मुख्य उद्देश्य फार्म परिस्थितियों के अन्तर्गत स्थानीय भेड़ों में सुधार करना है जिसमें सर्वप्रथम नर मेमनों को चयन सूचकांक के आधार पर चुना जाता है। अठारह माह की आयु पर चयनित मेमनो का परीक्षक भेड़ों से संभोग कराया जाता है। तत्पश्चात इन मेढ़ों का मूल्याकन उनके संतानो की उत्पादन क्षमता के आधार पर किया जाता है तथा उत्कृष्ट 2—3 मेढ़ों का चयन कर उनका प्रजनन हेतु प्रयोग किया जाता है। प्रत्येक प्रक्षेत्र आधारित इकाई में चार केन्द्र हैं जिसमें से एक केन्द्र मेढ़ा पालन केन्द्र होता है एवं लगभग 1500 प्रजनन योग्य भेड़ प्रति केन्द्र द्वारा कवर होते हैं। मद्रास रेड़ भेड़ों के छः माह के शारीरिक भार एवं मगरा भेड़ में प्रथम चिकनाईयुक्त ऊन उत्पादन एवं छः माह के शारीरिक भार के आधार पर किसानों के रेवड़ों से उत्कृष्ट नर मेमनों का चयन किया जाता है। प्रारंभ में 3 माह की आयु पर नर मेमनों को चिन्हित किया जाता है तथा प्रथम कल्पन के पश्चात्/बाजार आधारित शरीर भार पर अंतिम रूप से चयन किया जाता है। इम्प्रूवर रेवड़ों से चयनित नर मेमनों को मूल रेवड़ों को प्रजनन हेतु आपूर्ति की जाती है। भेड़ सुधार पर नेटवर्क परियोजना के इकाई वार परिणाम संक्षेप में नीचे प्रस्तुत किए जा रहे हैं:

मारवाड़ी इकाई, मरु क्षेत्रीय परिसर (सी.एस.डब्लू.आर.आई.), बीकानेरः जन्म, 3, 6, 9 एवं 12 माह की आयु पर वर्ष 2014 में जन्में मेमनो का औसत शारीरिक भार क्रमशः 3.19, 16.45, 23.03, 28.33 एवं 31.09 किग्रा. रहा। भेड़ों की उपलब्धता के आधार पर समागम एवं मेंमनो की जन्म दर क्रमशः 97.54 एवं 87.15 प्रतिशत रही। औसत व्यास, मेडूलेशन एवं रेशो की लंबाई क्रमशः 37.28 माइक्रॉन, 55.76 प्रतिशत एवं लगभग 4.59 सेमी थी। वयस्क वार्षिक चिकनाईयुक्त ऊन उत्पादन 1481 ग्रा. था। कुल उत्तरजीवितता 97.70 प्रतिशत थी। कुल 77 मारवाड़ी मेढे एवं 28 नर मेमने भेड़ सुधार कार्यक्रम हेतु विभिन्न ऐजेन्सियों को बेचे गए।

मुजफ्फरनगरी इकाई, सी.आई.आर.जी, मखदूमः वर्ष 2014 में जन्में मेमनों का जन्म, 3, 6, 9 एवं 12 माह की आयु पर औसत शारीरिक भार क्रमशः 3.60, 17.03, 26.84, 33.34 एवं 38.34 किग्रा. पाया गया। समागम 97.3 प्रतिशत था। उपलब्ध भेड़ों के एवं समागम के आधार पर मेमनो का जन्म दर प्रतिशत क्रमशः 91.1 एवं 88.3 रहा। प्रथम सर्विस पर मादा का वजन, प्रथम सर्विस की उम्र, प्रथम ब्यान की उम्र एवं प्रथम ब्यान के समय मादा का वजन का औसत क्रमशः 34 किग्रा, 423 दिन, 578 दिन एवं 38.8 किग्रा था। कुल उत्तरजीविता 97.18 प्रतिशत थी। वयस्क वार्षिक चिकनाईयुक्त ऊन उत्पादन 1293 ग्रा. था। भेड़ सुधार कार्यक्रम हेतु कुल 125 मेढ़े विभिन्न ऐजेन्सियों को बेचे गए।

डक्कनी इकाई, एम.पी.के.वी, राहुरीः जन्म, 3, 6, 9 एवं 12 माह की आयु पर वर्ष 2014 में जन्में मेमनो का औसत शारीरिक भार क्रमशः 3.47, 16.13, 24.54, 25.83 एवं 28.69 किग्रा. रहा। समागम 97.12 प्रतिशत था जबकि उपलब्ध भेड़ों के आधार पर मेमना

जन्म दर 90.06 प्रतिशत था। प्रथम सर्विस की उम्र, प्रथम ब्यान की उम्र एवं प्रथम ब्यान के समय मादा की वजन का औसत क्रमशः 476 दिन, 624 दिन एवं 34.2 किग्रा था। कुल उत्तरजीवितता 97.93 प्रतिशत थी। इकाई द्वारा भेड़ सुधार कार्यक्रम हेतु 36 मेढ़े बेचे गए तथा 30 मेढ़े किसानों / विभिन्न ऐजेन्सियों को वितरित किए गए।

नेल्लोर इकाई, एस.वी.वी. यू., एल.आर.एस. पालमनेरः जन्म, 3, 6, 9 एवं 12 माह की आयु पर वर्ष 2013—14 में जन्में मेमनो का औसत शारीरिक भार क्रमशः 3.16, 14.01, 22.10, 25.21 एवं 29.01 किग्रा. रहा। वर्ष 2014—15 में जन्में मेमनों का जन्म, 3 एवं 6 माह की आयु पर औसत शारीरिक भार क्रमशः 3.01, 15.20 एवं 21.03 किग्रा रहा। समागम 95.21 प्रतिशत था। उपलब्ध भेड़ों के आधार पर एवं समागम के आधार पर मेमना जन्म दर प्रतिशत क्रमशः 88.35 एवं 84.13 रहा। वर्ष के दौरान कुल 70 मेढ़े भेड़ सुधार कार्यक्रम हेतु विभिन्न ऐजेन्सियों को बेचे गए।

मद्रास रेड़ इकाई, टी.ए.एन.यू.वी.ए.एस, एल.आर.एस. कटुपक्कमः कुल 11296 भेडों का पंजीयन किया गया जिसमें 114 पंजीकृत भेड पालकों की 6090 प्रजनन योग्य भेड़े शामिल थी। जन्म, 3, 6 एवं 12 माह के स्तर पर वर्ष 2013—14 में जन्में मेमनों का औसत शारीरिक भार क्रमशः 2.58, 11.53, 15.59 एवं 20.53 किग्रा. रहा। वर्ष 2014—15 में जन्में मेमनों का जन्म एवं दूध छुडाने तक की आयु का भार क्रमशः 2.34 एवं 10.59 किग्रा रहा। मेमना जन्म दर 85.50 प्रतिशत देखी गई। कुल 810 मेमनों को उत्पादन क्षमता रिकार्डिंग के लिएं चिन्हित किया गया। विभिन्न केन्द्रों के पंजीकृत किसानों में कुल 27 नये खरीदे गये तथा 58 प्रयोग में लाये गये मेढ़े वितरित किये गये।

मगरा इकाई, मरु क्षेत्रीय परिसर (सी.एस.डब्लू.आर.आई), बीकानेरः कुल 8212 भेड़ों का पंजीयन किया गया जिसमें 100 पंजीकृत भेड़ पालको की 4493 प्रजनन योग्य भेड़े शामिल थी। वर्ष 2014—15 में जन्में मेमनों का जन्म, 3, 6 एवं 12 माह के स्तर पर औसत शारीरिक भार क्रमशः 2.50, 16.30, एवं 23.20 एवं 30.30 किग्रा था। इस वर्ष के दौरान मेमना जन्म दर 79.72 प्रतिशत रहा। विभिन्न केन्द्रों के पंजीकृत किसानों को कुल 98 मेढ़े वितरित किए गए।

वर्ष 2013—14 के दौरान किए गए कार्यों की समीक्षा हेतु डॉ. के. एम. एल. पाठक, उपमहानिदेशक (पशु विज्ञान) की अध्यक्षता में दिनांक 29—30 अक्टुबर, 2014 को नई दिल्ली में वार्षिक समीक्षा बैठक का आयोजन किया गया। डॉ. आर.एस. गाँधी, सहायक महानिदेशक (ए.पी.एण्ड बी), डॉ. एस. एम. के. नकवी निदेशक, के. भे. एवं ऊ. अनु. संस्थान, डॉ. विनीत भसीन, प्राचार्य वैज्ञानिक, भा.कृ.अ. परिषद, डॉ. अरुण कुमार विभागाध्यक्ष (ए.जी.बी.) एवमं छः भेड़ इकाईयों के मुख्य अन्वेषक / सहायक—मुख्य अन्वेषक एवं केन्द्रीय भेड़ एवं ऊन अनुसंधान संस्थान के वैज्ञानिकों ने बैठक में भाग लिया। छः इकाईयों द्वारा की गई प्रगति की समीक्षा की गई तथा कार्यक्रम में आगे सुधार हेतु सुझाव एवं सिफारिशें की गई।

केन्द्रीय भेड़ एवं ऊन अनुसंधान संस्थान, अविकानगर में भेड़ सुधार पर नेटवर्क परियोजना की प्रक्षेत्र आधारित इकाईयों के वैज्ञानिकों / प्रोफेसरों / मुख्य अन्वेषकों के लिए "भेड़ों में मद समकालन एवं कृत्रिम गर्भाधान का प्रदर्शन'' विषय पर दिनांक 20—26 अगस्त, 2014 तक प्रशिक्षण कार्यक्रम आयोजित किया गया। भेड़ सुधार पर नेटवर्क परियोजना की नेल्लौर, मद्रास रेड, डक्कनी एवं मारवाडी तथा मेगा शीप सीड परियोजना की मेचेरी, मांड्या एवं मालपुरा ईकाई के प्रतिभागियों ने इस प्रशिक्षण कार्यक्रम में भाग लिया। प्रशिक्षण के उदघाटन कार्यक्रम के मुख्य अतिथि डॉ. सुरेश होनापागोल, पशुपालन कमिश्नर, (पशुपालन, दुग्ध एवं मत्यस्य विभाग),भारत सरकार थे। प्रो. (डॉ.) एम. एल. मदन, पूर्व उपमहानिदेशक, भा.कृ.अ. परिषद प्रशिक्षण कार्य के समापन समारोह में मुख्य अतिथि के तौर पर प्रमाण—पत्र वितरित किये।

1. NETWORK PROJECT ON SHEEP IMPROVEMENT

1.1   INTRODUCTION:

The Network Project on Sheep Improvement (NWPSI) came into being on 1.4.1990, when all the centres of All India Coordinated Research Project on Sheep Breeding (AICRP-SB) were transformed into NWPSI Centres. The basic difference between AICRP-SB and NWPSI is that AICRP-SB was mainly focused on crossbreeding of genetically low yielding indigenous sheep breeds with high yielding exotic sheep whereas, in NWPSI emphasis has been given on evaluation and improvement of indigenous sheep genetic resources by selective breeding. Under NWPSI different breeds of sheep are being improved through selection and inter-se mating for wool and mutton production.

Presently, there are six ongoing cooperating centres of NWPSI in the country with its coordinating unit at PC Cell, ICAR-Central Sheep and Wool Research Institute, Avikanagar, Tonk (Rajasthan). Four of these units are farm based units while two of them are field based units.

1. Coordination Cell: PC Cell, NWPSI, ICAR-CSWRI, Avikanagar

2. Cooperating Units:

Sr. No	Location	Breed	Purpose
A. Farm based cooperating units			
1	ARC (CSWRI), Bikaner	Marwari sheep	Carpet Wool
2	CIRG, Makhdoom	Muzaffarnagri sheep	Dual purpose
3	MPKV, Rahuri	Deccani sheep	Dual purpose
4	SVVU, Palamner	Nellore sheep	Mutton
B. Field based cooperating units			
1	TANUVAS, K attupakkam	Madras Red sheep	Mutton
2	ARC (CSWRI), Bikaner	Magra sheep	Carpet Wool

1.2   OBJECTIVE

The objective of NWPSI is genetic improvement of indigenous sheep breeds by selection.

1.3   TECHNICAL PROGRAMME

(a) Farm based Technical Programme: Under the farm based projects, technical programme aims at improvement of indigenous sheep breeds under farm conditions wherein the male lambs are first ranked using selection criteria/ index. Index incorporates body weight at different ages and wool yield at six months of age in carpet wool breeds. Best lambs are selected and mated by the age of 18 months. Subsequently these rams are again evaluated based on their progeny performance and best rams are selected and used for breeding. Each unit is maintaining about 350 breedable ewes. Target is to achieve 500 breedable ewes. Each unit was to develop selection criteria for the selection of the rams. About 50 improved breeding rams will be developed every year for sale from each farm units for improvement of farmer's flock. Performance evaluation of these rams in farmer's flock will be done. Selection indices/ criteria being followed by different units are given in Table 1.

Table 1. Selection criteria used in farm based units.

Breed	Selection Criteria
Marwari	6.61* (six month body weight) + 0.483* (first six monthly clip yield)
Muzaffarnagri	Six month body weight
Deccani	Six month body weight
Nellore	Three and six months body weight

(b) Field based Technical Programme: In the field based units, each unit will have four centres from which one will be the ram-rearing centre. Each of the other three centres will cover a population of about 1500 breedable ewes. Each centre is expected to cover several villages and within each village several sheep flock owners, those having 30 to 40 breedable ewes will be selected under the project. In the breeding tract of these breeds information will be collected on the best animals. Once these flocks are indentified at more than one location, selection of best adult males (for the first year) after proper verification of their age by dentition will be made. These selected males will be purchased. One of the four centres will maintain the breeding males which will have all the infrastructure facilities (Institute farm, if available). Subsequently ram lambs will be purchased based on body weight and wool cover. Purchased animals will be reared and recorded for body weight, wool production and wool quality up to 12 months of age to select best male.

During the breeding season these males will be distributed to flocks having 30-40 breedable females. After the use for 2-3 breeding seasons, the rams will be taken back to the ram rearing centre or redistributed to other farmers for further use. At the time of lambing, data on the progeny born will be recorded. All the animals covered under this project will have unique number of identification provided by ear tagging/tattooing/ other suitable method of identification. Performance recording with respect to growth, wool production and reproduction of ewes and rams will be recorded. For the lambs born, the records will be maintained on weight immediately after the birth. Thereafter, the animals will be weighed at the time of weaning (90 days) and at the age of six months (180 days) and 12 months. The farmers will be motivated to shear these animals at around six months of age and the first greasy fleece weight will be recorded. A small sample of wool will be taken for wool quality analysis.

The data so collected will be analysed in detail and a suitable criteria/ selection index will be worked out for estimating breeding values of the sires. Depending on their breeding values, the best sire will be indentified. During each year at least 20 percent of the total rams shall be replaced by selecting superior males from the field.

For successful information collection, the incentives, already being given and to be continued in future, are adequate health control for the registered animals (prophylactic and curative, both), providing necessary guidelines and technical knowhow and making availability of breeding rams (free breeding services). Semen quality evaluation of breeding rams distributed by field based units and breeding rams sold by farm based units should be done. Screening of rams for Brucella is also essential. Field units are exploring the possibilities of AI with freshly diluted liquid semen combined with oestrous synchronization to accelerate superior germplasm dissemination. Insurance of distributed rams in field flock is being followed at Madras Red sheep unit.

1.4. Targets:

Following targets were finalized during the Annual Review Meeting held during 16-17th November, 2013 at Jaipur.

A. Targets for Farm Based Units:

Particulars	Marwari		Deccani		Nellore		Muzaffarnagri	
	Male	Female	Male	Female	Male	Female	Male	Female
Body Weight at 6 month (kg)	25	21	26	22	24	20	26	22
Body Weight at 12 month (kg)	30	26	30	26	29	24	35	30
Lambing (%) (on ewes available basis)	85 (to achieve 95% by March, 2017)							
Mortality up to one year (%)	<5		<5		<5		<5	
Mortality adult annual (%)	<5		<5		<5		<5	
Culling up to one year (%)	As per the requirement of the project							
Age at first lambing (days)	600		600		600		600	
Replacement rate (%)	30		30		30		30	
Annual greasy fleece wt. (kg)	1.50		-		-		-	
Sale of rams	50		50		50		50	

Targets for Field Based Units (Madras Red and Magra units):

Main targets for Field Based Units are coverage of at least 4500 breedable ewes, maximizing health coverage and distribution of breeding rams (100/ unit /year).
- Distribution of Rams: 100 No / year
- Identification and performance recording of progeny
- Introduction of AI with liquid semen.

Hon'ble Dr.K.M.L.Pathak, DDG (Animal Science) at Magra Unit

2. UNIT-WISE PERFORMANCE OF NWPSI CENTRES

2.1 ARC (ICAR-CSWRI), BIKANER (RAJASTHAN): MARWARI SHEEP FOR CARPET WOOL

Project title: Improvement of Marwari sheep for carpet wool production through selection.

Targets and achievement:

Particulars	Target		Achievement	
	Male	Female	Male	Female
Body weight at 6 month (kg)	25	21	24.78	21.18
Body weight at 12 month (kg)	30	26	33.01	29.79
Lambing (%) (on ewes available basis)	95 (by March,17)		87.15	
Mortality up to one year (%)	<5		1.68	
Mortality adult annual (%)	<5		2.42	
Culling up to one year (%)	As per need		18.51	
Age at first lambing (days)	600		662	
Replacement rate (%)	30		12.78	
Annual greasy fleece wt. (kg)	1.50		1.481	
Sale of rams	50		77	

Progress of work

Flock Statistics:

The opening and closing balance of Marwari flock during the year ending March 2015 was 841 and 737, respectively (Table 1). Additions were due to lambing (328) and deductions were due to mortality (27), culling (234) and sale (169) to Government agencies/ NGO/ farmers etc. Breedable ewes available were 389.

Culling and Mortality:

The overall mortality and culling irrespective of age group were 2.30 and 20.02 % during the year 2014-15, respectively. Age group wise details of culling and mortality are presented (Table 2). The culling and mortality rates were 3.22, 7.61, 16.84, 18.51, 17.66 % and 1.51, 0.49, 0.00, 1.68, 2.42 % respectively in lamb, weaner, hogget, up to one year age and adult group, respectively. There was increase in culling of weaner (31) and hogget (62), which resulted in 18.51 % culling up to one year of age.

Reproduction:

The reproductive performance of Marwari ewes during year 2012-14 has been presented (Table 3). The overall annual tupping, lambing on available and bred basis during 2014-15 were 97.54, 87.15 and 91.31 %, respectively. The twinning percentage was 2.82. Age at first service and age at first lambing were 493 and 662 days, respectively. Weight at first service and weight at first lambing were 28.97 and 32.28 kg, respectively. Replacement rate was 12.78%. During 2014-15, about 57 yearling female were added to the flock. Culling (27) and sale (33) of hogget female resulted in lower replacement rate.

Growth Performance:

The data on growth performance of the lambs born during the year 2012 to 2014 were subjected to least squares analysis and results are presented (Table 4). Overall least squares means of body weight at birth, 3, 6, 9 and 12-months age of lambs born during the year 2014-15 were 3.19, 16.45, 23.03, 28.33 and 31.09 kg, respectively (Table 4a). The overall least squares means for daily body weight gain during 0-3 month, 3-6 month and 6-12 month of the lambs born during year 2014-15 were 146.25, 78.43 and 34.16 g, respectively.

Greasy Fleece Yield:

The least squares means of adults and lambs clip from 2012-15 are presented (Table 5). The overall least squares means for adult spring, autumn, annual and lambs 1st and 2nd clip during 2014 were 691.86, 767.22, 1481.23, 546.18 and 679.92 g, respectively. Wool samples were analysed for various wool quality traits. The least squares means for fibre diameter, medullation, staple length and crimp were 37.28μ, 55.76%, 4.59 cm and 0.49 per cm, respectively for 2014-15 clip.

Selection of the Rams:

Selection of rams was made based on index combining body weight and wool yield at 6 month of age (SI = 6.61 x weight at six months + 0.483 x first clip greasy fleece yield). Ranking of the selected rams was made based on their index score. A total of 21 superior rams were selected and used for breeding.

Selection differential:

The selection differentials for 6 month weight and first six monthly GFY was 8.26 kg and 205 g, respectively. Observed response to selection was positive for six month weight (1230 g) and first GFY (60 g).

Sale of breeding stock:

A total of 77 breeding rams and 28 hogget males were sold to various developmental agencies and farmers for genetic improvement. 31 ewes and 33 hogget female were also sold.

Performance recording of progeny in field:

Performance recording of progeny born in field is to be started on priority.

Sheep farmers selecting Marwari ram for purchase

Table 1: Flock statistics for the year 2014-2015

Age group	Opening balance		Closing balance	
	Male	Female	Male	Female
0-3 Months	99	100	64	45
3-6 Months	14	-	30	29
6-12 Months	30	23	66	52
Adult	129	446	62	389
Total	**272**	**569**	**222**	**515**

Table 2: Culling and Mortality Percentage

Age Group	Culling(%)			Mortality(%)		
	Male	Female	Total	Male	Female	Total
0-3M	3.90 (11/282)	2.44 (6/245)	3.22 (17/527)	2.12 (6/282)	0.81 (2/245)	1.51 (8/527)
3-6M	7.44 (16/215)	7.81 (15/192)	7.61 (31/407)	0.00 (0/215)	1.04 (2/192)	0.49 (2/407)
6-12M	17.58 (35/199)	15.97 (27/169)	16.84 (62/368)	0.00 (0/199)	0.00 (0/169)	0.00 (0/368)
0 -12 M	19.01 (62/326)	17.91 (48/268)	18.51 (110/594)	1.84 (6/326)	1.49 (4/268)	1.68 (10/594)
Adult	27.13 (54/199)	13.91 (70/503)	17.66 (124/702)	2.01 (4/199)	2.58 (13/503)	2.42 (17/702)
Overall	31.78 (116/455)	16.52 (118/714)	**20.02 (234/1169)**	2.19 (10/455)	2.38 (17/714)	**2.30 (27/1169)**

Figures within brackets are number of observation

Table 3: Reproduction performance for the period from 2012 to 2014

Year	No. of ewes available	No. of ewes tupped	No. of ewes lambed	Tupping (%)	Lambing % (Available basis)	Lambing % (Tupped basis)
2012	414	400	375	96.66	90.57	93.75
2013	382	354	328	93.20	85.86	92.65
2014	366	357	319	**97.54**	**87.15**	91.31

Table 4: Growth performance of Marwari lambs for the year 2012 to 2014 (kg)

Effect/ Trait	Birth Wt.	3M Wt.	6M Wt.	9 M Wt.	12M Wt.
Over all mean	3.20±0.01 (1007)	16.37±0.08 (940)	23.49±0.12 (779)	27.90±0.17 (438)	30.70±0.18 (384)
Year					
2012	3.31±0.03 (261)	16.08±0.16 (246)	21.66±0.24 (199)	25.30±0.24 (172)	27.47±0.25 (151)
2013	3.03±0.02 (325)	16.65±0.15 (314)	25.87±0.20 (277)	30.00±0.22 (204)	33.10±0.23 (181)
2014	3.17±0.02 (421)	16.37±0.13 (380)	22.93±0.19 (303)	28.40±0.40 (62)	31.53±0.43 (52)

Figures within brackets are number of observation

Table 4a: Growth performance of Marwari lambs (kg) in year 2014

Effect/Trait	Birth Wt.	3M Wt.	6M Wt.	9M Wt.	12M Wt.
Mean	3.19±0.25 (421)	16.45±0.15 (380)	23.03±0.21 (303)	28.33±0.35 (62)	31.09±0.33 (52)
Sex					
Male	3.25±0.03 (218)	17.45±0.21 (197)	**24.78±0.27 (156)**	30.42±0.36 (28)	**33.01±0.38 (21)**
Female	3.13±0.03 (203)	15.38±0.18 (183)	**21.18±0.26 (147)**	26.61±0.36 (34)	**29.79±0.34 (31)**

Figures within brackets are number of observation

Table 5: Greasy fleece weight of Marwari adults and lambs (gm)

Effect	Adult Clip			Lamb Clip	
	Spring	**Autumn**	**Annual**	**First**	**Second**
Over all mean	716.53±5.89 (1204)	758.10±5.46 (1324)	1474.63±9.67 (1065)	580.22±6.72 (748)	728.27±10.04 (380)
Year					
2012	753.69±9.82 (340)	609.55±8.47 (409)	1399.48±14.83 (323)	525.60±13.29 (171)	786.18±14.71 (143)
2013	630.44±8.41 (420)	897.53±7.70 (418)	1543.18±12.93 (367)	668.88±12.20 (203)	718.72±13.33 (176)
2014	691.86±8.11 (444)	767.22±6.79 (497)	**1481.23±12.54 (375)**	546.18±8.99 (374)	679.92±22.51 (61)

Figures within brackets are number of observation

Table 6: Wool quality attributes of Marwari sheep

Effect	Diameter (μ)	Hetro (%)	Hairy (%)	Medullation (%)	Staple length (cm)	Crimp (/ cm)
Over all mean	37.39±0.19 (794)	39.49±0.36 (794)	15.73±0.33 (794)	54.97±0.49 (794)	5.06±0.04 (794)	0.60±0.01 (794)
Year						
2011	37.02±0.28 (296)	41.80±0.54 (296)	16.07±0.49 (296)	57.87±0.74 (296)	5.16±0.06 (296)	0.58±0.02 (296)
2012	39.98±0.38 (162)	43.81±0.73 (162)	16.57±0.66 (162)	59.02±1.00 (162)	5.51±0.08 (162)	0.70±0.03 (166)
2013	33.30±0.31 (240)	35.65±0.60 (240)	11.29±0.55 (240)	47.20±0.82 (240)	5.59±0.07 (240)	0.63±0.02 (240)
2014	**37.28±0.51 (96)**	36.73±0.97 (96)	18.99±0.89 (96)	**55.76±1.33 (96)**	**4.59±0.19 (96)**	**0.49±0.04 (96)**

Figures within brackets are number of observation

Marwari ram

Training to Sheep Farmers

2.2   ICAR- CIRG, MAKHDOOM (U.P.): MUZAFFARNAGRI SHEEP FOR MUTTON AND WOOL

Project Title: Genetic evaluation and improvement of Muzaffarnagri sheep for body weight and wool yield.

Targets and achievement:

Particulars	Target		Achievement	
	Male	Female	Male	Female
Body Weight at 6 month (kg)	26	22	29.1	24.6
Body Weight at 12 month (kg)	35	30	42.4	34.3
Lambing (%) (on ewes available basis)	85 (95 by March, 17)		88.3	
Mortality up to one year (%)	<5		1.86	
Mortality adult annual (%)	<5		2.73	
Culling up to one year (%)	As per need		7.46	
Age at first lambing (days)	600		579	
Replacement rate (%)	30		30.6	
Sale of rams	50		125	

Progress of work

Flock Statistics:

The flock strength of Muzaffarnagri sheep for the year 2014-15 is presented (Table 1). The opening balance was 590 sheep while the closing (31.03.2015) was 580. The addition was due to birth of 225 lambs while the reduction was mainly due to death (23), culling (69) and sale (131). 125 adult rams and 6 ewes were sold. Breedbale ewes available were 310.

Culling and Mortality:

The overall culling in 0-3 month, 3-6 month, 6-12 month, 0-12 month age group and adults were 1.01, 5.15, 4.76, 7.46 and 6.74%, respectively. The mortality was recorded as 0.67, 1.51, 0.40, 1.86 and 2.73 % in the 0-3 month, 3-6 month, 6-12 month, 0-12 month age group and adult, respectively. The overall culling and mortality was 8.47 and 2.82%. The overall culling on health ground was 0.61%.

Reproductive Performance:

The reproductive performances of ewes in the year 2014 are depicted in Table 3. The annual tupping, lambing on available basis and lambing on bred basis were 97.3, 88.3 and 91.1%. Twinning significantly improved during this year as compared to previous years. Average weight at first service, age at first service, age at first lambing and ewes weight at lambing were 33.99 kg, 423.2 days, 578.7 days and 38.8 kg, respectively. There is reduction in age at first lambing from 639 to 579 days due to effective planning and reproductive management. Replacement rate was 30.6%. There was increase in incidence of abortion (20) and still birth (10) and this needs

attention for further improvement in reproductive efficiency. Artificial insemination of 51 ewes was done using fresh diluted semen and conception rate of 57.0% was obtained.

Growth Performance:

The data on growth traits generated over the years (2012-14) were subjected to least squares analysis and results are presented in Table 4. The overall least squares means for body weight at birth, 3, 6, 9 and 12 months of age were 3.70, 16.80, 25.66, 30.76 and 35.60 kg respectively. Body weights of lambs born during 2014 at birth, 3, 6, 9 and 12 months of age were 3.60, 17.03, 26.84, 33.34 and 38.34 kg, respectively (Table 4a). The overall average daily weight gain (2014) at pre-weaning (0-3 month) and post-weaning (3-6, 6-12 month) were 150, 104 and 64 g, respectively. Ewe productivity efficiency (EPE) at birth, weaning and six month of age were 4.21, 20.98 and 31.20 for ewes lambed during 2014. These figures for the year 2013 were 4.33, 20.83 and 28.92 kg, respectively.

Greasy Fleece Yield:

The least squares means for fleece yield at different clips are presented in Table 5. The overall least squares means for lambs 1st and 2nd season clip and adult annual clip were 539.22, 542.55 and 1248.04 g, respectively during last three years. In year 2014, the means for lambs first, second and adult annual clips were 609.02, 565.40 and 1293.40 g, respectively.

Selection of Rams:

Selection of rams was done on the basis of 6-month body weight. Top 12 rams were selected and used for breeding. Semen quality parameters of breeding rams were evaluated before breeding.

Selection Differential and Response to selection:

The selection differential for six month body weight was 7.4 kg for year 2014-15. Response to selection was reported to be positive for six months weight. The h^2 estimates of birth, 3, 6, 9, 12 month body weight and first six monthly clips were 0.012, 0.191, 0.322, 0.451, 0.515 and 0.187, respectively.

Sale of breeding stock:

A total of 131 germplasm (125 rams and 6 ewes) were sold to various developmental agencies and farmers for genetic improvement.

Performance recording of progeny in field:

Five flocks at village Parkham having total flock strength of 301 with 117 breedable ewes were selected for performance recording. The average body weight at birth, 3, 6 and 12 month age were 3.2, 13.7, 21.2 and 28.5 kg in the progeny born from rams sold by the unit. Corresponding body weights at birth, 3, 6 and 12 month were 3.0, 11.7, 18.0 and 24.7 kg in the progeny born from local rams. On comparison of body weights of two sets of progeny, it was observed that progeny born from farm rams were superior at all stages (17.1 % at weaning and 17.8 % at six months weight) than progeny born from local rams.

Table 1: Flock statistics

Age group	Opening balance as on 1.4.2014		Closing balance as on 31.3.2015	
	Male	Female	Male	Female
0-3 Months	29	42	43	27
3-6 Months	58	51	37	43
6-12 Months	8	16	27	49
Adult	102	284	44	310
Total	**197**	**393**	**151**	**429**

Table 2: Annual culling and mortality percentage

Age group	Culling (%)			Death (%)		
	Male	Female	Total	Male	Female	Total
0 – 3M	0.71 (140)	1.28 (156)	1.01 (296)	1.43 (140)	0.00 (156)	0.67 (296)
3 – 6M	4.60 (152)	6.58 (178)	5.15 (330)	2.63(152)	0.56 (178)	1.51 (330)
6 –12M	7.14 (112)	2.86 (140)	4.76 (252)	0.89 (112)	0.00 (140)	0.40 (252)
Up to 1 year	7.77 (206)	7.17 (223)	7.46 (429)	3.40 (206)	0.45 (223)	1.86 (429)
Adult	4.49 (178)	7.82 (371)	6.74 (549)	0.56 (178)	3.77 (371)	2.73 (549)
Overall	7.79 (308)	8.87 (507)	**8.47** (815)	2.60 (308)	2.96 (507)	**2.82** (815)

* **Culling on health ground = 0.61%,** Figures within brackets are number of observation

Table 3: Ewes reproductive performance

Lambing period	Ewes available	Ewes tupped	Tupping %	No of lambing	Lambing %		Twining %
					Ewes available	Ewes tupped	
2012-13	298	259	86.9	202	74.3	86.7	20.3
2013-14	290	271	93.4	194	76.9	83.2	14.9
2014-15	293	285	**97.3**	226	**88.3**	91.1	17.2

Muzaffarnagri flock

Table 4: Growth performance of Muzaffarnagri lambs (kg)

Particulars	Birth wt.	3M Wt.	6M Wt.	9M Wt.	12M Wt.
Overall mean	3.70±0.03 (635)	16.80±0.16 (602)	25.66±0.23 (483)	30.76±0.27 (378)	35.60±0.29 (359)
Year					
2012	3.75±0.05 (197)	15.19±0.30 (182)	22.04±0.41 (151)	27.44±0.42 (133)	32.23±0.46 (124)
2013	3.78±0.05 (228)	18.20±0.28 (216)	28.19±0.37 (190)	31.56±0.37 (179)	36.33±0.39 (174)
2014	3.58±0.04 (210)	17.01±0.29 (204)	26.75±0.43 (142)	33.27±0.60 (66)	38.26±0.65 (61)

Figures within brackets are number of observation

Table 4a: Growth performance of Muzaffarnagri lambs(kg) 2014 born

Particulars	Birth Wt.	3M Wt.	6M Wt.	9M Wt.	12M Wt.
Mean	3.60± 0.05 (210)	17.03± 0.28 (204)	**26.84± 0.43 (142)**	33.34± 0.61 (66)	**38.34± 0.63 (61)**
Sex					
Male	3.74± 0.09 (81)	17.63± 0.44 (79)	29.10± 0.71 (48)	36.10± 0.95 (26)	42.36± 0.95 (26)
Female	3.46± 0.07 (129)	16.43± 0.35 (125)	24.58± 0.51 (94)	30.58± 0.77 (40)	34.32± 0.82 (35)

Figures within brackets are number of observation

Table 5: Greasy fleece yield (g) of Muzaffarnagri sheep

Particulars	Lambs Clip		Adult annual
	First season	Second season	
Overall mean	539.22±6.71 (637)	542.55±6.71 (516)	1248.04±17.89 (695)
Year			
2012	530.31±10.19 (268)	569.33±10.03 (220)	1288.33±23.08 (208)
2013	478.10±12.29 (184)	492.91±13.31 (124)	1162.40±20.89 (245)
2014	**609.02±12.27 (185)**	**565.40±11.31 (172)**	**1293.40±21.55 (242)**

Figures within brackets are number of observation

Table 6: Genetic and phenotypic parameters of body weights and first clip GFY

Category	Birth Wt.	3 M Wt.	6 M Wt.	9 M Wt.	12 M Wt.	I[st] clip GFY
Birth Wt.	**0.012±0.059**	0.475	0.355	0.316	0.265	0.179
3 M Wt.	< 0	**0.191±0.061**	0.777	0.583	0.433	0.370
6 M Wt.	< 0	0.773±0.150	**0.322±0.101**	0.875	0.729	0.423
9 M Wt.	< 0	0.804±0.173	0.936±0.038	**0.451±0.152**	0.856	0.305
12 M Wt.	< 0	0.795±0.183	0.789±0.092	0.967±0.026	**0.515±0.164**	0.291
I[st] clip GFY	< 0	0.518±0.236	0.506±0.160	<0	<0	**0.187±0.096**

Diagonal h^2 estimates, above diagonal are phenotypic and below diagonal are genetic correlations

2.3 MPKV RAHURI (MAHHARASHTRA): DECCANI SHEEP FOR MUTTON

Project Title: Network Project on Improvement of Deccani Sheep for dual purpose.

Targets and achievement:

Particulars	Target		Achievement	
	Male	Female	Male	Female
Body Weight at 6 month (kg)	26	22	26.60	22.49
Body Weight at 12 month (kg)	30	26	30.92	26.46
Lambing (%) (on ewes available basis)	85 (95 by March, 17)		90.06	
Mortality up to one year (%)	<5		1.52	
Mortality adult annual (%)	<5		3.02	
Culling up to one year (%)	As per need		6.00	
Age at first lambing (days)	600		624	
Replacement rate (%)	30		29.36	
Sale of rams	50		36 + 30* =66	

* Distributed

Progress of work

Flock Statistics:

The total population of the Deccani sheep in beginning and at the end of the year (2014-2015) was 638 and 712, respectively. Addition in the flock was due to lambing (304) and reductions were due to death (34), sale (42) and culling (107). Breedbale ewes available were 380. Details of the population statistics are presented (Table 1). Ewe replacement rate was 29.36 per cent. Overall mortality and culling on health ground in the flock was 2.06 and 6.48 per cent. Mortality and culling during the period under report is depicted in Table 2. The mortality in age groups viz. 0-3, 3-6, 6-12 month and adult was 2.25, 0.82, 1.41 and 3.02 per cent, respectively. The culling in age groups viz. 0-3, 3-6, 6-12 month and adult was 2.75, 4.11, 13.03 and 7.39 per cent, respectively.

Reproductive Performance:

Annual reproductive performance for the year 2014-15 is presented (Table 3). Tupping percentage was 97.12. Lambing percentage based on ewes available was 90.06. Twining of 1.67% was observed. The average age at first service, average age at first lambing and inter lambing period was 476.39±14.56, 624.38±14.62 and 298.03±8.15 days, respectively. Replacement rate was 29.36 %.

Growth Performance:

Growth data recorded on the lambs born during 2013-15 is presented (Table 4). Average birth, three, six, nine and twelve months body weights of lambs born during 2013-15 were 3.45, 15.92, 23.98, 25.64 and 27.99 kg, respectively. Least squares means for body weights at birth, 3, 6, 9 and 12 months of 2014 born lambs were 3.47, 16.13, 24.54, 25.83 and 28.69 kg, respectively (Table 4a). Efforts taken during last year resulted in improvement in the post weaning body weights. Ewe productivity efficiency (EPE) was 3.59 kg at birth and 14.33 kg at weaning.

Greasy Fleece yield:

The overall least squares means for lambs 1st and 2nd clip and adult annual clip were 438.55, 461.55 and 1039.07 g, respectively for last three years (2012-15). Corresponding values for the year 2014-15 was 442.90, 471.70 and 1026.71 g, respectively.

Selection of rams:

Preliminary selection of rams was done on the basis of body weight at six months and 11 rams were selected. The selection differential for six monthly body weights was 2.80 kg.

Response to Selection:

Response to selection of the rams used during 2013-14 was positive for six months weight. Heritability of body weight at birth, 3, 6, 9 and 12 months of age were 0.028, 0.039, 0.313, 0.280 and 0.278, respectively.

Sale of breeding stock:

During the year under report 36 rams were sold for breed improvement programme. Unit reported that 30 rams were distributed to farmers.

Performance recording of progeny in field:

Improvement of 9.15 % in birth weight and 8.82 % in 3 months weight were observed in farmer's flock from the progeny born from rams distributed/sold by the unit. Average body weight at birth and weaning of lambs born from improved breeding rams were 3.22 and 14.19 kg, respectively.

Dr.R.S.Gandhi, ADG (AP&B) visited Deccani Unit

Table 1: Flock statistics

Age group	Opening balance 1.04.2014		Closing balance 31.03.2015	
	Male	**Female**	**Male**	**Female**
0-3 Months	42	54	61	46
3-6 Months	45	47	43	45
6-12 Months	6	20	32	35
Adult	97	327	70 + 47*	380
Total	**190**	**448**	**253**	**506**

* 47 rams are distributed in field and available with farmers.

Table 2: Annual culling and death percentage for the year 2014–15

Age group	Culling (%)			Mortality (%)		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
0-3 months	2.84 (6/211)	2.64 (5/189)	2.75 (11/400)	3.32 (7/211)	1.06 (2189)	2.25 (9/400)
3-6 months	3.30 (6/182)	4.92 (9/183)	4.11 (15/365)	0.55 (1/182)	1.09 (2/183)	0.82 (3/365)
6-12 months	16.79 (23/137)	9.52 (14/147)	13.03 (37/284)	1.46 (2/137)	1.36 (2/147)	1.41 (4/284)
Up to 1 Year	6.60 (35/530)	5.39 (28/519)	6.00 (63/1049)	1.89 (10/530)	1.16 (6/519)	1.52 (16/1049)
Adult	9.30 (16/172)	6.62 (28/423)	7.39 (44/595)	1.74 (3/172)	3.55 (15/423)	3.02 (18/595)
Total	7.26 (51/708)	5.94 (56/942)	**6.48** (107/16)	1.85 (13/708)	2.23 (21/942)	**2.06** (34/1650)

Figures within brackets are number of observation

Table 3: Reproduction performance

Period / Traits	Tupping (%)	Lambing (%) ewes available	Age at first lambing (days)	Inter lambing period (days)	Twinning (%)
2012-13	93.94 (265)	83.02 (220)	636.85±6.87 (36)	298.97±2.97 (184)	--
2013-14	93.84 (305)	90.44 (265)	637.08±6.60 (52)	301.09±2.54 (213)	1.02
2014-15	**97.12 (337)**	**90.06 (299)**	624.38±14.62 (56)	298.03±8.15 (248)	1.67

Figures within brackets are number of observation

Table 4: Growth performance of Deccani Sheep

Particulars	Body weight (in kg)				
	Birth Wt.	3 M Wt.	6 M Wt.	9 M Wt.	12 M Wt.
Overall mean	3.45±0.03 (640)	15.92±0.17 (438)	23.98±0.21 (296)	25.64±0.35 (233)	27.99±0.14 (185)
Year					
2013	3.44±0.05 (233)	15.71±0.24 (196)	23.20±0.25 (171)	25.07±0.38 (157)	27.32±0.38 (133)
2014	3.45±0.04 (296)	16.13±0.22 (242)	24.76±0.30 (125)	26.20±0.54 (76)	28.66±0.60 (52)
2015	3.45±0.03 (111)	--	--	—	--

Figures within brackets are number of observation

Table 4a: Least squares means for body weight (kg) (2014 born)

Particulars	Birth Wt.	3M Wt.	6 M Wt.	9M Wt.	12M Wt.
Overall mean	3.47±0.03 (296)	16.13±0.23 (242)	**24.54±0.33** (125)	25.83±0.41 (76)	**28.69±0.54** (52)
Sex					
Male	3.54±0.04 (150)	16.64±0.31 (125)	26.60±0.44 (63)	27.73±0.56 (35)	30.92±0.76 (22)
Female	3.40±0.04 (146)	15.63±0.33 (117)	22.49±0.42 (62)	23.93±0.51 (41)	26.46±0.66 (30)

Figures within brackets are number of observation

Table 5: Greasy fleece yield of Deccani sheep (g)

Particulars	Lambs Clip		Adult Annual
	1st Clip	2nd Clip	
Overall mean	438.55±5.12 (489)	461.55±7.06 (353)	1039.07±2.95 (1247)
Year			
2012-13	436.12±9.35 (146)	453.57±12.72 (108)	1035.98±5.26 (391)
2013-14	436.64±8.74 (167)	459.37±12.38 (114)	1054.54±5.09 (418)
2014-15	442.90±8.51 (176)	471.70±11.57 (131)	1026.71±5.19 (438)

Figures within brackets are number of observation

Deccani lambs

AI with liquid semen

2.4. SVVU, PALAMNER (ANDHRA PRADESH) : NELLORE SHEEP FOR MUTTON

Project Title: Network Project on Nellore sheep improvement.

Targets and achievement:

Particulars	Target		Achievement	
	Male	Female	Male	Female
Body Weight at 6 month (kg)	24	20	23.26	20.78
Body Weight at 12 month (kg)	29	24	31.71	27.37
Lambing (%) (on ewes available basis)	85 (95 by March, 17)		84.13	
Mortality up to one year (%)	<5		3.31	
Mortality adult annual (%)	<5		4.84	
Culling up to one year (%)	As per need		5.87	
Age at first lambing (days)	600		715	
Replacement rate (%)	30		24.79	
Sale of rams	50		70	

Progress of work

Flock Statistics:

The opening and closing balance during the report period 2014-15 was 656 and 754, respectively. Additions were due to lambing (334) and reductions were due to death (65), sale of breeding rams (70), emergency culling (13), culling (125) and slaughter (4). Total reductions were 277. Ewes replacement rate was 24.79 percent. The details of population statistics have been presented (Table 1). Breedable ewes available are 420.

Culling and Mortality:

The mortality percentage in 0-3 months, 3-6 months, 6-12 months, 0-12 months and adult groups were 6.28, 1.97, 1.28, 3.31 and 4.84 %, respectively while the culling percentage in 0-3 months, 3-6 months, 6-12 months, 0-12 months and adult groups are 1.91, 0.66, 22.22, 5.87 and 10.16 %, respectively (Table 2). The overall mortality and culling percentage during the year 2014-15 were 3.88 and 7.46 %, respectively.

Reproduction:

The reproductive performance during the period under report is presented (Table 3). Overall tupping percentage was 95.21. During this year a total of 334 ewes lambed. The overall lambing percentage was 84.13 % based on the available basis and 88.35 % based on the ewes tupped basis. Replacement rate was 24.79%. There is improvement in reproductive performance over the years. The average age at first service, average age at first lambing and weight at lambing was 565 days, 715 days and 34 kg, respectively. Efforts are required to be taken to reduce the age at first lambing.

Growth Performance:

The Least square means of body weights of lambs born during the years 2012-15 are presented (Table 4). The overall least square means for birth, weaning, six months, nine months and 12 months weight were 3.16, 14.01,

20.10, 25.21 and 29.01 kg, respectively for lambs born during 2013-14. The least square means of body weight at birth, weaning and six months were 3.01, 15.20 and 21.03 kg, respectively for the lambs born during the year 2014-15. Ewe productivity efficiency (EPE) at birth and weaning were 3.01 and 13.92 kg, respectively. There is significant improvement in growth performance is observed.

Selection of rams:

Preliminary selection was done on the basis of sequential selection incorporating body weight at weaning and six months of age.

Selection Differential:

Selection differential of rams used during the year 2014-15 were 1.53 kg for 3 months body weights and 3.11 kg for 6 months body weights.

Sale of breeding stock:

During the year under report 70 adult rams were sold to different farmers for breed improvement programme.

Performance recording of progeny in field:

Nine field flocks was covered for performance recording. The average body weights at birth, 3 and 6 months were 2.53, 11.00 and 21.50 kg, respectively for progeny born from sold rams. Performance needs comparison with base line performance.

Nellore ram

Nellore flock

Lambs born by AI

Table 1: Flock statistics

Age group	Opening Balance		Closing Balance	
	Male	Female	Male	Female
0-3 Months	18	14	44	49
3-6 Months	110	103	102	108
6-12 Months	-	-	-	-
Adult	44	367	31	420
Total	172	484	177	577

Table 2: Annual culling and mortality percentage for the year 2014-2015

Age group	Culling %			Mortality %		
	Male	Female	Total	Male	Female	Total
0-3 Months	1.68 (3/178)	2.13 (4/188)	1.91 (7/366)	6.18 (11/178)	6.38 (12/188)	6.28 (23/366)
3-6 Months	0.43 (1/230)	0.88 (2/226)	0.66 (3/456)	2.17 (5/230)	1.77 (4/226)	1.97 (9/456)
6-12 Months	26.23 (32/122)	17.86 (20/112)	22.22 (52/234)	1.64 (2/122)	0.89 (1/112)	1.28 (3/234)
Up to 1 year	6.79 (36/530)	4.94 (26/526)	5.87 (62/1056)	3.4 (18/530)	3.23 (17/526)	3.31 (35/1056)
Adult	0.83 (11/121)	10.42 (52/499)	10.16 (63/620)	7.44 (9/121)	4.21 (21/499)	4.84 (30/620)
Overall	7.22 (47/651)	4.68 (78/1025)	**7.46** (125/1676)	4.15 (27/651)	3.71 (38/1025)	**3.88** (65/1676)

Figures within brackets are number of observation

Table 3: Reproductive Performance from 2012- 2015

Year	Ewes available for breeding	No. of ewes tupped	Tupping %	No. of lambs born	Lambing % based on	
					Breedable ewes available	Ewes tupped
2012-13	345	304	88.11	278	80.57	91.45
2013-14	329	317	96.35	282	85.10	88.32
2014-15	397	378	**95.21**	334	**84.13**	**88.35**

Table 4: Growth performance of Nellore lambs(kg) from 2012 to 2015

Effect	Birth Wt	3 M Wt.	6 M Wt.	9 M Wt.	12 M Wt.
Overall mean	3.10 ±0.01 (892)	14.50 ±0.11 (835)	21.02±0.17 (683)	26.10 ±0.21 (466)	29.01 ±0.22 (419)
Year					
2012-13	3.15 ±0.02 (278)	14.37 ±0.18 (271)	22.10 ±0.24 (256)	26.75 ±0.28 (247)	29.06 ±0.28 (240)
2013-14	3.16 ±0.02 (280)	14.01 ±0.18 (267)	20.10 ±0.26 (234)	25.21 ±0.32 (219)	**29.01 ±0.33** (179)
2014-15	3.01 ±0.02 (334)	15.20 ±0.17 (297)	**21.03 ±0.34** (193)	-	-

Figures within brackets are number of observation

2.5   TANUVAS, KATTUPAKKAM (TAMIL NADU): MADRAS RED SHEEP FOR MUTTON

Project Title: Evaluation and genetic improvement of Madras Red sheep for mutton production in farmers' flocks.

Targets and achievement:

Particulars	Target	Achievement
Breedable ewes covered	> 4500	6090
Distribution of ram	100	85 (27 new and 58 redistributed)
Introduction of oestrous synchronization and AI	-	AI lab is established, 14 ewes were synchronized
Identification and performance recording of progeny	-	810 progeny identified

Progress of Work

Madras Red Sheep is one of the important meat breeds of Tamil Nadu. Sheep skins are preferred in tanning due to better grains in fine sheep leather. This is a field based Unit. As envisaged in the technical programme four centres of Project were established as below. Livestock Research Station, Kattupakkam identified as ram rearing centre.

Centre I   :   Ponmar, Madurapakkam, Kandigai, Kayarambedu and Mevalurkuppam

Centre II   :   Kondamangalam, Sirukundram, Otteri, Kazhanipakkam, Rayamangalam, Sasthrampakkam, Venpakkam and Veerapuram

Centre III   :   Aanoor, Vayalur, Mettukudisai, Periyavaiyavur and Andavakkam.

Centre IV   :   PGRIAS, Kattupakkam (Ram Rearing Centre)

Two new villages and 10 new sheep farmers were added. The work of registration of flocks in the villages, identification of breedable ewes by tattooing, performance recording of rams, sheep were protected from various disease by adopting preventive measures against parasites, contagious diseases and nutritional deficiencies at all the centres was continued during the year.

Flock Statistics:

The population of sheep covered (114 sheep farmers) under this scheme during the year 2014-15 was 11296 out of which 5206 were young sheep and 6090 were adult ewes. The population of sheep were 3066, 4332 and 3898 for centre I, II and III. The centre-wise flock statistics is given (Table 1).

Reproduction:

Centre wise and village wise reproductive performance for the year 2014-15 is given in Table 3. A total of 6090 ewes were available during the year and gave birth to 5206 lambs. During the year 2014-15, 85.50 percent lambing was observed.

Growth Performance:

Body weights at birth, three, six and twelve months are given (Table 4). Overall mean of body weights for lambs born during 2013-14 for birth, 3, 6 and 12 months were 2.58, 11.53, 15.59 and 20.53 kg, respectively. Overall mean of body weights for lambs born during 2014-15 for birth and three months were 2.34 and 10.59 kg, respectively. Progeny born from distributed rams had higher body weight at six month (16.17 vs 15.02 kg) and 12 months of age (21.33 vs 19.73 kg) when compared to control flock. Progeny of improved rams were 7.66% superior at six months and 8.11% at 12 months of age.

Distribution of rams:

During 2014-15, a total of 62 rams were purchased and distributed to various centres. A total of 27 new rams were distributed and 58 rams were redistributed to registered farmers during the year 2014-15. Insurance of nine rams was claimed after death. 32 old age and poor performing rams were taken back from field and slaughtered to generate income. A total of 164 distributed rams were available with farmers as on 31.03.2015 and covered by insurance. Number of breeding rams available at centre I, II, III and ram rearing centre were 36, 47, 45 and 36 rams, respectively.

Selection Differential:

Average selection differential was 5.25 kg at purchase (about 9 to 12 months). Suitable selection criteria by incorporation of body weight at different ages may be developed for effective selection.

Oestrus Synchronization and Artificial Insemination:

Synchronization of ewes for fixed time AI /mating was implemented in two villages, Madurapakkam and Kayarambedu. A total of 14 ewes were synchronised. Eight ewes which showed heat were mated.

Health Control Programme and Disease Incidence:

Sheep were vaccinated against PPR, Sheep Pox and Enterotoxaemia. A total of 23756 vaccinations were given against PPR (7546), Sheep Pox (8077) and Enterotoxemia (8133). A total of 17218 deworming were given using ivermectin. Outbreak of anthrax was confirmed at Sasthirambakkam village and ring vaccination (1400 sheep) was carried out. The incidence of general systemic, alimentary system, respiratory system and skin and sub-cutaneous system were 65, 16, 7 and 12 % respectively. Screening of rams for Brucella was initiated.

Demonstration of supplementary feeding:

Field demonstration on supplementary feeding of concentrates during lean season was conducted at Ponmar village. Three treatment groups with rate of feeding at 125g/day, 200g/day and no concentrate feeding were formed. Body weight gain obtained was 68.8, 87.0 and 70.2 g per day in the three treatment groups, respectively.

Table1:   Flock statistics as on 31-03-2015

Centre	Breeders	Breeding rams	Breedable ewes	Young stock	Total sheep
I	33	36	1718	1348	3066
II	41	47	2292	2040	4332
III	40	45	2080	1818	3898
Ram rearing centre	-	36	-	-	-
Total	**114**	**164**	**6090**	**5206**	**11296**

Table 2: Identification of individual animals in farmer's flock

Trait	Number of animals identified during 2014-15			
	Centre I	Centre II	Centre III	Total
Initially by ear tag	192	305	274	771
Later by tattoo	230	355	225	810

Table 3: Ewes reproductive performance

Centre	Number of ewes available for breeding	No. of ewes lambed	Lambing %
I	1718	1348	78.46
II	2292	2040	89.00
III	2080	1818	87.40
Overall	**6090**	**5206**	**85.50**

Table 4: Growth Performance of Madras Red Sheep (kg) during 2012 - 2015

Year	Birth Wt.	3 M Wt.	6 M Wt.	12 M Wt.
2012-13	2.59 ± 0.05 (550)	11.62 ± 0.13 (872)	15.57 ± 0.22 (479)	21.13 ± 0.22 (448)
2013-14	2.58 ±0.04 (565)	11.53 ±0.15 (593)	15.59 ±0.22 (1232)	20.53 ±0.39 (604)
2014-15	2.34 ±0.13 (345)	10.59 ±0.13 (1257)	-	-

Figures within brackets are number of observation

Madras Red ram

Oestrous synchronization

Madras Red flock

2.6 ARC, ICAR-CSWRI, BIKANER (RAJASTHAN): MAGRA SHEEP FOR CARPET WOOL

Project Title: Evaluation and genetic improvement of Magra sheep in farmers' flock.

Targets and achievement:

Particulars	Target	Achievement
Breedable ewes covered	> 4500	4493
Distribution of ram	100	98
Introduction of oestrous synchronization and AI		AI lab is established and pilot work on oestrous synchronization initiated
Identification and performance recording of progeny		Identification of animals for performance recording is under progress

Progress of work

Magra field based sheep unit was shifted from RAJUVAS, Bikaner to ARC, CSWRI, Bikaner with effect from 01.04.2013. As envisaged in the technical programme, four centres of project were established at Kotra, Jalwali, Kanasar and ram rearing center at ARC. The technical inputs were given in the form of treatment of diseased animals and advisory services for management and breeding of animals at each of the centre.

Flock Statistics:

New centres were indentified viz. Kotra, Kanasar and Jalwali areas in the breeding track to Magra sheep. The centre-wise flock details registered under the project as on 31.03.2015 is given in Table 1. A total of 8212 sheep were registered and out of which, 4493 were adult ewes. The population of sheep covered were 3736, 2491 and 1985 at Kotra, Kanasar and Jalwali centres, respectively.

Reproduction:

The reproductive performance of Magra unit in three centres during 2014-15 is presented in Table 2. A total of 4493 ewes were available and 3582 ewes were lambed. The lambing percent was highest in Jalwali centre (82.98) followed by Kanasar (79.96) and Kotra (77.98). Overall lambing was 79.72 percent and needs improvement. Weight of ewe at mating and lambing were not reported.

Growth Performance:

The data of growth performance during the year 2014-15 is presented (Table 3). The overall average means of birth weight, three month weight, six month weight and twelve month weight was recorded as 2.45±0.02, 16.29±0.08, 23.19±0.12 and 30.34±0.26 kg, respectively. Performance at Kanasar centre was superior in comparison of other centres. Overall mean of body weight at two year age was recorded as 40.12±0.50 kg. Data on growth performance of progeny born from distributed rams are under recording and unit reported that growth performance of progeny will be made available from next year onwards.

Wool Production:

Greasy fleece yield was recorded in field flocks. Three times shearing per year was practised. Wool production performances in all the centres showed more or less similar pattern. Spring clip yielded more GFY in comparison of other seasons at all the centres. The detail of wool yield in different centres has been presented (Table 4). Quality of wool was also assessed. Average fibre diameter, medullation and staple length of fibre were 36.17μ, 47.27% and 5.66 cm. Studies on lustre parameter on Magra sheep in field needs to be undertaken.

Distribution of Rams:

A total of 70 rams were purchased during the year. A total of 98 rams were distributed to the registered breeders. About 27, 33 and 38 rams were distributed to the farmers of Kotra , Kanasar and Jalwali centres, respectively. A total of 166 rams were available with the unit as on 31.03.2015. Rams available at Kotra, Kanasar, Jalwali and ram rearing centres were 48, 27, 31 and 60, respectively.

Health Control Programme and Disease Incidence:

The health control programme was taken up during the year 2014-15 as one of the major inputs in the form of deworming, control of ecto-parasites and vaccination against infectious diseases (Sheep Pox, PPR and Enterotoxaemia). The total number of cases handled as prophylactic measures for deworming and vaccination were 6528 and 27416, respectively. A total of 4066 cases were treated for various diseases at three centres. The overall mortality reported was 4.87% (7.65% in Jalwali, 4.12% in Kotra and 4.23% in Kanasar centres).

Demonstration of supplementary feeding:

Field demonstration on supplementary feeding by complete feed blocks was demonstrated in Jalwali, Kanasar and Darbari villages. At Jalwali village, lambs were fed with either feed blocks or guar straw for a period of 56 days. The average daily gain was 191.5 g in supplemented group while in non-supplemented group it was 154.0 g. At Kanasar village, lambs were fed for a period of 45 days and the average daily gain was 177.8 g in supplemented while in non-supplemented it was 134.4 g. At Darbari village lambs were fed for a period of 90 days. The average daily gain was 108.8 g in supplemented group while in non-supplemented group it was 86.8 g. Field demonstration on supplementary feeding of pregnant ewes was also conducted at Jalwali village.

Sheep farmers selecting Magra rams for breeding

Table 1: Flock statistics (as on 31.03.2015)

Name of Centre	Breeders	Rams	Adult female	Young stock	Total registered sheep
Kotra	36	177	2221	1338	3736
Kanasar	36	87	1173	1231	2491
Jalwali	28	103	1099	783	1985
Total	100	367	4493	3352	8212

Table 2: Ewes reproductive performance

Centre	Number of ewes available for breeding	No. of ewes lambed	Lambing Percent
Kotra	2221	1732	77.98
Kanasar	1173	938	79.96
Jalwali	1099	912	82.98
Overall	4493	3582	79.72

Table 3: Growth performance of Magra sheep (kg) in farmer's flock

Particulars	Birth Wt.	3M Wt.	6M Wt.	12M Wt.	24 M Wt.
Overall Mean	2.45 ±0.02 (1135)	16.29 ±0.08 (1151)	23.19 ±0.12 (715)	30.34 ±0.26 (354)	40.12 ±0.50 (153)
Sex					
Male	2.57 ±0.03 (546)	17.91 ±0.12 (453)	24.81 ±0.21 (260)	33.33 ±0.62 (99)	46.70 ±0.84 (25)
Female	2.35 ±0.02 (589)	15.23 ±0.09 (698)	22.26 ±0.13 (455)	29.18 ±0.23 (255)	38.84 ±0.50 (128)
Centre					
Kotra	2.57 ±0.03 (272)	16.32 ±0.13 (427)	22.79 ±0.18 (294)	29.15 ±0.57 (76)	39.11 ±0.74 (14)
Kanasar	2.61 ±0.03 (555)	15.57 ±0.15 (437)	23.77 ±0.21 (251)	33.17 ±0.53 (144)	36.84 ±0.77 (52)
Jalwali	2.07 ±0.03 (308)	17.32 ±0.13 (287)	23.02 ±0.28 (170)	28.94 ±0.25 (164)	43.95 ±0.34 (87)

Figures within brackets are number of observation

Distribution of Magra ram in the presence of Dr.S.M.K.Naqvi, Director, CSWRI

Table 4: Greasy Fleece yield (GFY) of Magra sheep (g) in different centres

Centres	Adult			Hogget		
	Spring clip	Autumn clip	Winter clip	Spring clip	Autumn clip	Winter clip
Kotra	678.74±4.34 (475)	553.16±5.02 (553)	555.31±7.32 (207)	907.47±9.89 (87)	425.01±7.84 (395)	723.44±10.76 (32)
Kanasar	688.56±15.69 (292)	538.27±10.79 (260)	537.50±9.77 (204)	782.90±22.41 (200)	447.32±7.36 (336)	582.70±11.49 (189)
Jalwali	678.89±5.58 (398)	541.90±11.12 (142)	513.64±22.95 (44)	690.54±7.21 (112)	471.43±38.66 (21)	566.28±23.39 (43)

Figures within brackets are number of observation

Table 5: Wool quality attributes of Magra sheep

Centre	Fibre diameter (μ)	Medullation (%)	Staple length (cm)
Overall Mean	36.17±0.49 (157)	47.27±1.78 (157)	5.66±0.09 (157)
Kotra	41.80±1.04 (44)	65.97±2.94 (44)	5.5±0.14 (44)
Kanasar	34.77±0.51 (58)	44.47±2.23 (58)	5.87±0.16 (58)
Jalwali	33.16±0.63 (55)	35.26±2.68 (55)	5.57±0.16 (55)

Figures within brackets are number of observation

Magra field flock

Training to women farmers on balanced feed block preparation

3. INFRASTRUCTURAL SETUP OF NWPSI UNITS

3.1 STAFF POSITION: The staff position is given as on 31.3.2015

3.1.1 Project Coordination (PC) Cell, ICAR- CSWRI, Avikanagar :

No	Name of Posts	Number of Posts		
		Sanction	Filled	Vacant
1.	S R F	1	1	-

3.1.2   Cooperating Units located at SAU's (as on 31.03.2015)

No	Unit	Number of Posts								
		Deccani			Nellore			Madras Red		
	Name of Posts	Sanction	Filled	Vacant	Sanction	Filled	Vacant	Sanction	Filled	Vacant
1.	Professor	1	1	-	1	1	-	1	1	-
2.	Assistant Professor	1	1	-	1	1	-	1	1	-
3.	Technical / Livestock Assistant	1	1	-	1	1	-	1	1	-
4.	L.D.C	1	-	1	1	1	-	1	1	-
5.	RA / SRF (Temporary)	1	1	-	1	1	-	1	1	-
	Total	5	4	1	5	5	0	5	5	0

3.1.3   Cooperating Units located at ICAR Institute (as on 31.03.2015)

Unit	Post of SRF : Status		
	Sanction	Filled	Vacant
Marwari	1	1	-
Magra	1	1	-
Muzzafarnagri	1	1	-

3.2 Meeting and training held during 2014-15

Training program on *"Demonstration of Oestrous Synchronization and Artificial Insemination (AI) in Sheep"* for scientists/ Professors/ Co-PIs /Technical officers of field based units of Network Project on Sheep Improvement was conducted during 20-26th August, 2014 at CSWRI, Avikanagar. Dr. Suresh Honnappagol, Animal Husbandry Commissioner, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India presided over as the chief guest during the inaugural function. Participants from Nellore, Madras Red, Deccani and Marwari units of NWPSI and Mecheri, Mandya and Malpura units of MSSP participated in the training. Prof. (Dr.) M. L. Madan, Former DDG, ICAR presided over as the chief guest during the valedictory function and distributed the certificates.

Participants of Training on AI

Annual Review Meeting to review the performance made during 2013-14 was held at NASC Complex, New Delhi on 29-30th, October, 2014 under the chairmanship of Dr. K.M.L.Pathak, DDG (Animal Science). Dr. R.S.Gandhi, ADG (AP&B), Dr. S.M.K.Naqvi, Director, CSWRI, Dr. Vineet Bhasin, Principal Scientist, ICAR, Dr.Arun Kumar, Head (AGB) and PIs/Co-PIs from six sheep units and scientists from CSWRI participated in the meeting. Progress made by the six cooperating units was reviewed and suitable suggestions and recommendations were provided for further improvement in the programme.

Annual Review Meeting (2013-14)

3.3 Budget Allocation for the year 2014-15 (as RE)   (Rs. In Lakhs)

Type	PC Cell	Farm Based Units				Field Based Units		Total	ICAR share*	State Share
Location	ICAR	ICAR	ICAR	SAU	SAU	ICAR	SAU			
Head/ Unit	PC Cell, CSWRI, Avikanagar	Marwari, ARC, Bikaner	Muzaffarnagari, CIRG, Makhdoom	Nellore, SVVU, Tirupati	Deccani , MPKV, Rahuri	Magra, ARC, Bikaner	Madras Red, TANUVAS, Chennai			
A. Revenue										
Salaries	0.00	0.00	0.00	35.00	28.40	0.00	35.00	98.40	**73.80**	24.60
Domestic TA	1.00	0.55	0.30	0.72	0.48	0.75	0.96	4.76	**4.22**	0.54
Research and Operational Expenses	6.00	16.00	19.00	19.40	23.00	13.50	17.00	113.90	**99.05**	14.85
HRD (within India)	0.00	0.20	0.00	0.00	0.00	1.00	0.36	1.56	**1.47**	0.09
Total (A)	7.00	16.75	19.30	55.12	51.88	15.25	53.32	218.62	**178.54**	40.08
B. Capital										
Equipment	2.80	1.00	1.20	0.60	0.68	8.50	6.00	20.78	**18.96**	1.82
Livestock	0.00	0.00	0.00	0.00	0.00	3.00	4.00	7.00	**6.00**	1.00
Furniture & fixtures	2.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	**2.00**	0.00
Minor Works	0.00	2.00	0.00	0.00	2.00	1.00	0.00	5.00	**4.50**	0.50
Total (B)	4.80	3.00	1.20	0.60	2.68	12.50	10.00	34.78	**31.46**	3.32
Grant Total (A + B)	11.80	19.75	20.50	55.72	54.56	27.75	63.32	253.40	210.00	43.40
ICAR Share	11.80	19.75	20.50	41.79	40.92	27.75	47.49	210.00	-	-
State Share	-	-	-	13.93	13.64	-	15.83	43.40	-	-

* ICAR Share is calculated as 100% funding to units located under ICAR and 75% funding to units located under SAUs

Annual Review Meeting (2013-14)

3.4. Infrastructure (2014-15)

Equipments approved under EFC of XII Plan (2012-17) and listed for the year 2014-15 were purchased by different units. List of equipments purchased during 2014-15 are given below.

Sr. No	Name of the equipment
I. Marwari Unit, ARC	
1	Feeding trough – 20 Nos
2	Digital Camera
3	Digital weighing balance -2 Nos
II. Muzzafarnagri Unit, CIRG	
1	Camera
2	Microscope
III. Deccani Unit, MPKV	
1	Digital Camera
2	Tattooing set
3	Automatic drenching gun
IV. Nellore Unit, SVVU	
1	Automatic Drenching Gun – 2 Nos
2	Digital weighing balance
3	Tattooing Set
4	Microscope
V. Madras Red Unit, TANUVAS	
1	Colorimeter
2	Deep Freezer (-20)
3	Analytical weighing balance
4	Microscope
5	Warm stage microscope

Sr. No	Name of the equipment
VI. Magra Unit, ARC	
1	Analytical balance
2	Water Distillation Unit
3	Hot air oven
4	Autoclave
5	water bath
6	Deep freezer
7	Colorimeter cum spectrophotometer
8	Warm stage microscope
9	P^H meter Digital
VII. PC Cell, CSWRI	
1	Digital copier with printer
2	Laser Colour Printer
3	Split Air Conditioner
4	Laptop

Facility for AI with liquid semen created	
1	Madras Red Unit, TANUVAS
2	Magra Unit, ARC, CSWRI

AI lab inaugurated by Hon'ble Dr.K.M.L.Pathak, DDG (Animal Science) at Magra Unit

3.5. Unit Visits:

Sheep Units were visited by higher authorities from ICAR Head Quarters, Project Coordinator and Scientists involved in PC Cell for effective monitoring and evaluation of the project. Details of visits are listed below.

Sr. No	Name and Designation	Unit	Date
1.	Dr. S. Ayyappan, Secretary DARE & DG, ICAR, New Delhi	Muzzafarnagri Unit, CIRG, Makhdoom	06.04.2014
2.	Dr. K. M. L. Pathak, DDG(AS), ICAR, New Delhi	Muzzafarnagri Unit, CIRG, Makhdoom	06.04.2014
3.	Dr. B. S. Prakash, ADG (AN&P), ICAR, New Delhi	Muzzafarnagri Unit, CIRG, Makhdoom	06.04.2014
4.	Dr. S. M. K. Naqvi, Director, CSWRI & Project Coordinator	Magra Field Unit, ARC, CSWRI, Bikaner	23.06.2014
5.	Dr. S. M. K. Naqvi, Director, CSWRI & Project Coordinator	Marwari Farm Unit, ARC, Bikaner	23.06.2014
6.	Dr. S. M. K. Naqvi, Director, CSWRI & Project Coordinator	Muzzafarnagri Unit, CIRG, Makhdoom	03.11.2014
7.	Dr. R. S. Gandhi, ADG (AP&B), ICAR, New Delhi	Deccani Farm Unit, MPKV, Rahuri	10.01.2015
8.	Dr. R. S. Gandhi, ADG (AP&B), ICAR, New Delhi	Madras Red Field Unit, PGRIAS, Kattupakkam	14.02.2015
9.	Dr. Arun Kumar, Head (AGB), CSWRI	Muzzafarnagri Unit, CIRG, Makhdoom	03.11.2014
10.	Dr. L. Leslie Leo Prince, Sr. Scientist, Incharge PC Cell, CSWRI	Nellore Farm Unit, LRS, SVVU, Palamaner.	10.12.2014
11.	Dr. L. Leslie Leo Prince, Sr. Scientist, Incharge PC Cell, CSWRI	Madras Red Field Unit, PGRIAS, Kattupakkam	12.02.2015

Dr.R.S.Gandhi, ADG (AP&B) interacting with sheep farmers at Madras Red unit

Hon'ble Dr.K.M.L.Pathak, DDG (Animal Science) interacting with Magra sheep farmers

Hon'ble Dr.K.M.L.Pathak, DDG (Animal Science) at Muzffaranagi unit

4. PUBLICATIONS

4.1. Research papers published/accepted:

1. Ekambaram.B., Kalyan Chakravarthi. M. and Rajesh. M. M. (2014). Effect of Non genetic factors on Growth Performance of Nellore sheep under farm conditions. *Indian Veterinary Journal* 91(11): 48-52.

2. Ekambaram.B., Kalyan Chakravarthi. M. and Rajesh. M. M. (2014). Incidence of Lantana poisoning in Nellore sheep under farm conditions. *Indian Veterinary Journal* 91(12): 80-82.

3. Gopal Dass, Ajoy Mandal and P.K. Rout (2014). Genetic and phenotypic parameters of growth traits in Muzaffarnagari sheep. *Indian Journal of Animal Sciences*, 84: 1328-1331.

4. Mane, P. M., R. G. Nimase, S. T. Pachpute,V. D. Modad and D. S. Rasane (2014). Mortality pattern of Deccani sheep in organized farm condition. *The Indian Journal of Small Ruminants*, 21(1) : 132-134.

5. Mane, P.M., S. T. Pachpute and R. G. Nimase (2014). Growth and reproductive performance of Deccani sheep, *The Indian Journal of Small Ruminants*, 20(2): 23-27.

6. Nirban LK, R.K. Joshi, H.K. Narula, H. Singh and S. Bhakar (2015). Genetic and non-genetic factors affecting body weights in Marwari sheep. *Indian Journal of Small Ruminants*, 21(1): 106-108.

7. Nirban, LK, R.K. Joshi, H.K. Narula, H. Singh and K. Jingar (2015). Factors affecting flock life and life-time greasy fleece weight in Marwari sheep. *Indian Journal of Small Ruminants*, 21(1): 109-111.

8. Rajkumar, V., Gopal Dass, Arun K. Verma and Arun K. Das (2014). Slaughter weight effect on carcass and meat quality of Muzaffarnagari lambs in intensive production system. *Indian Journal of Animal Sciences*, 84: 569-574.

9. Rout, M, Senapati, M.R., Mahapatra, J K ,Ayub,M, Narula, H K ,Sawal, R K and Sanyal, A.(2014). Prevalence of foot and mouth disease virus antibodies in an organized sheep farm of Rajasthan. *The Indian Journal of Small Ruminants* 20 (1):126-127.

10. Saxena, V K., Jha, B.K., Meena, A S, Narula, H K, Kumar, D and Naqvi, SMK(2015) Assessment of genetic variability in coding sequence of Melatonin receptor gene (MTNRIA) in tropical arid breeds of India. *Reproduction in Domestic Animals* doi: 10.111/rda 12503

11. Singh, H., U. Pannu, H.K. Narula, A. Chopra, Vivekanand and S.K. Bhakar (2014). Estimates of (co)variance components and genetic parameters of growth traits in Marwari sheep. *Journal of Applied Animal Research*, http:// dx.doi.org/ 10.1080 / 09712119. 2014. 987291

12. Venkataramanan, R., Sreekumar, C., Manonnmani, and Gopi, H. (2015). Oestrous Synchronisation using PMSG and GnRH in Progesterone primed ewes. *Intas Polivet*, 16: Accepted for Publication.

13. Venkataramanan, R., Sreekumar, C., Manonnmani, G., Balasubramanian, D., and Gopi, H. (2015) Effect

of supplementary feeding of concentrate feed in Madras Red lambs under field conditions. *The Indian Journal of Small Ruminants*, 21(1): 124-125.

14. Vivekanand, R K ; Joshi, R K.; Narula, H K ; Singh, H and Chopra,A. (2014). Effect of genetic and non genetic factors on growth profile of Magra sheep in arid region of Rajasthan. *The Indian Journal of Small Ruminants* 20(2):19-22.

15. Vivekanand, R K; Joshi, R K.; Narula, H K ; Singh, H and Chopra, A (2014) Heritability estimates of growth traits in Magra sheep. *The Indian Journal of Small Ruminants* 20(2):109-111.

16. गोपाल दास एवं प्रमोद कुमार राउत (2014). चयनित प्रजनन द्वारा मुजफ्फरनगरी भेड़ों के उत्पादन गुणो में आनुवंशिक सुधार. Bhartiya Krishi Anusandhan Patrika (*Research Journal of Agriculture and Animal Sciences*), 29 (3) : 132-135.

4.2. Research abstracts published/presented:

1. Ekambaram, B., M.M. Rajesh and C. Vijay Kumar (2015) "Study on Pre-weaning mortality pattern in Nellore lambs in an organized farm" was published in the compendium of XII Annual Convention of Society for Conservation of Domestic Animal Biodiversity (SOCDAB) held at TANUVAS, Chennai on 13-14 Feb, 2015.

2. Gopal Dass and P. K. Rout (2015). Evaluation of reproduction traits of Muzaffarnagari sheep. Published in the compendium of International Symposium on "Sustainable management of animal genetic resources for livelihood security in developing countries" organized by TANUVAS, Chennai and SOCDAB, NBAGR, Karnal from 13-14th Feb., 2015 at Madras Veterinary College, TANUVAS, Chennai, Page No. 62.

3. Gopal Dass, P. K. Rout and S. K. Singh (2014). Production performance of Muzaffarnagari sheep in organized flock. Published in the compendium of National Seminar on "Prospects and challenges in small ruminant production in India" held at Sheep Breeding Research Station, Sandynallah, The Nilgiris, Tamil Nadu from December 11-12, 2014, Page No.93.

4. Gopal Dass, P. K. Rout, Y. K. Kushwah and M. S. Dige (2015). Evaluation of production traits of Muzaffarnagari sheep. Published in the compendium of International Symposium on "Sustainable management of animal genetic resources for livelihood security in developing countries" organized by TANUVAS, Chennai and SOCDAB, NBAGR, Karnal from 13-14th Feb., 2015 at Madras Veterinary College, TANUVAS, Chennai, Page No. 61-62.

5. Gopal Dass, Souvik Paul and Vinay Chaturvedi (2014). Survivability of Muzaffarnagari sheep under semi arid climate of Uttar Pradesh. Published in the compendium of National Seminar on "Prospects and challenges in small ruminant production in India" held at Sheep Breeding Research Station, Sandynallah, The Nilgiris, Tamil Nadu from December 11-12, 2014, Page No. 210.

6. Gopal Dass, Souvik Paul, Vinay Chaturvedi and Nitika Sharma (2015). Survival rate of Muzaffarnagari sheep under organized farm. Published in the compendium of International Symposium on "Sustainable

management of animal genetic resources for livelihood security in developing countries" organized by TANUVAS, Chennai and SOCDAB, NBAGR, Karnal from 13-14th Feb., 2015 at Madras Veterinary College, TANUVAS, Chennai, Page No. 62-63.

7. Narula, H.K., Patel, A.K., Chopra, A. and Mehrotra, V. (2014). Evaluation of growth and wool production parameters of Magra sheep in an organized farm under arid region of Rajasthan. In National Seminar on "Prospects and Challenges in Small Ruminant Production in India" December 11-12, 2014 at TANUVAS, Ooty. Pp 100.

8. Nitika Sharma, Gopal Dass, Vinay Chaturvedi and Souvik Paul (2015). Normal biochemical values in different genetic lines of Muzaffarnagari ewes. Published in the compendium of International Symposium on "Sustainable management of animal genetic resources for livelihood security in developing countries" organized by TANUVAS, Chennai and SOCDAB, NBAGR, Karnal from 13-14th Feb., 2015 at Madras Veterinary College, TANUVAS, Chennai, Page No. 268.

9. Patel, A.K., Narula, H.K., Chopra, A. and Ayub, M. (2014). Performance of Magra sheep in field in arid zone of Rajasthan. In National Seminar on "Prospects and Challenges in Small Ruminant Production in India" December 11-12, 2014 at TANUVAS, Ooty. Pp 95.

10. Vamsi, K., R.M.V.Prasad, J.Suresh, B.Ekambaram and K.Moulikrishna .(2015) "Constraint analysis of sheep rearers in Chittoor district of Andhra Pradesh." was published in the compendium of XII Annual Convention of Society for Conservation of Domestic Animal Biodiversity (SOCDAB) held at TANUVAS, Chennai on 13-14 Feb, 2015.

11. Vishal Kumar, K. Veerabramhaiah, B. Ekambaram, K.Moulikrishna, M.M.Rajesh, A.Ravi.(2015) "Semen Characteristics of Nellore Jodipi Ram" was published in the compendium of XII Annual Convention of Society for Conservation of Domestic Animal Biodiversity (SOCDAB) held at TANUVAS, Chennai on 13-14 Feb, 2015.

4.3. Seminars/ workshops/ training in which the PI/Co-PI/Scientists of the units have participated:

1. Dr. A K Patel, Magra Unit, attended National Seminar on "Revisiting Management Policies and Practices for Indigenous Livestock & Poultry Breeds as Eco-Friendly Economic Producers" 9-11th October, 2014 at Navsari Agricultural University, Navsari.

2. Dr. Gopal Dass, Muzzafarnagri Unit, Dr. B. Ekambaram, Nellore Unit and Dr. L.L.L.Prince and Dr. Ved Prakash, PC Cell, participated in the International Symposium on "Sustainable management of animal genetic resources for livelihood security in developing countrie" organized by TANUVAS, Chennai and SOCDAB, NBAGR, Karnal from 13-14th Feb., 2015 held at Madras Veterinary College, TANUVAS, Chennai.

3. Dr. H. K. Narula, Marwari Unit, Dr. A. K. Patel, Magra Unit, Dr H. Gopi, Dr. Sreekumar and Dr. Venkataramanan of Madras Red Unit and Dr. L.L L. Prince, PC Cell, participated in "National Seminar

on Prospects and Challenges in Small Ruminant Production in India" held at Ooty, TN during 11th - 12th, December, 2014.

4. Dr. S. T. Pachpute, Dr. R.G. Nimase, and Dr. Mane P.M, Deccani unit, participated in Workshop on "Impact Analysis for Agril-Technologies in Research, Education & Extension" held at Directorate of Research, Mahatma Phule Krishi Vidyapeeth, Rahuri on 6th February, 2015.

5. Dr. S. T. Pachpute and Dr. R. G. Nimase, Deccani unit, participated in Workshop on "Global Opportunities in Agriculture Entrepreneurship/Business" held at College of Agriculture, Pune from 15-16th December 2014.

6. Dr. R. G. Nimase, Deccani unit, participated in Training on "Feed safety and nutritional security under changing climatic scenario" organized at IVRI, Izzatnagar from 3-23th June 2014.

7. Dr. R. Venkataramanan, Assistant Professor, Madras Red Unit participated in the International workshop on Livestock Research on Smallholder Farms in Developing Countries Sponsored by American Institute of Goat Research, Langston, Oklahoma held on 20th May, 2014.

8. Dr.R.Venkataramanan, Assistant Professor, Madras Red Unit, attended the refresher course in Computer Science held at ASC-UGC, University of Madras from 06/11/2014 to 26/11/2014.

9. Dr. R. Venkataramanan, Assistant Professor, Madras Red Unit, attended training on "Recent Advances in Statistical Genetics" held at IASRI, New Delhi from 03-23th February 2015.

10. Dr. G. Manonnmani, JRF, Madras Red Unit, attended the International Workshop on "Assisted Reproductive Techniques in Small Ruminants" held on 15 – 16 December, 2014 at VC&RI, Tirunelveli.

4.4. Use of data for research work of students/ collaboration with other projects, etc

Madras Red Unit:

1. Dr. Chitra, PhD scholar is continuing her work on 'Polymorphism of IGF1 BMP and CAST genes associated with growth traits in Madras Red and Mecheri sheep'. Dr. Chitra, PhD student obtained data on body weight of 71 Madras Red sheep for GWAS from Madras Red Sheep Unit.

2. Dr. Vijayasarathy, M.V.Sc scholar has completed his research work on May 2014 on Influence of deworming pressure on the composition and anthelminthic resistance status of the strongyle helminth fauna in sheep" at Madras Red Sheep Unit.

5. Action Taken Report (ATR) on the Recommendations made in the Annual Review Meeting (NWPSI) held on 29-30 October 2014 at NASC Complex, New Delhi

General recommendations (Network Project on Sheep Improvement)	
Recommendations	**Action Taken**
1. All the PIs should be from Animal Breeding background, if not, at least one Co-PI should be from Animal Breeding and the project should be with Department of Animal Genetics/ Breeding of the Institute/University for effective implementation of the technical programme.	Recommendation implemented. PIs are from AGB discipline in four units. Co-PI with specialization in AGB were included in Deccani and Madras Red Units. PIs informed that they are in contact with respective AG&B Department for effective implementation.
2. All the units must follow a common format for report preparation and presentation. Format for the monthly report, annual report and presentation will be provided by the PC cell.	Recommendation implemented. Common format for monthly and annual report was provided by PC Cell.
3. Receipts/ revenue generated under the projects must be refunded and reflected in AUC as per the ICAR guidelines. Copy of the guidelines / office order will be provided to all units by the coordinating unit.	Copy of the relevant ICAR orders were provided to all the units. Units located under SAU have incorporated the ICAR share of revenue generated in UC/AUC.
4. In the farm units, old age (>7 years) and non - productive females and surplus males must be culled immediately from the flock. Target of 500 breedable ewes may be ensured by March, 2015 along with maintaining of quality breeding stock.	Recommendation implemented by the PIs. As on 31.03.2015, the number of breedable ewes was 389 in Marwari, 310 in Muzaffarnagari, 380 in Deccani and 420 in Nellore sheep units. PIs informed that efforts are being made to reach the target of 500.
5. In the farm units, after preliminary selection, top ranking ram lambs required for breeding and additional 10% be retained and other stock must be disposed off immediately. Rams which were used for 2 years or more than four years old should be removed from the flock.	Recommendation implemented by the PIs.
6. In the farm units, reproductive parameters such as age at first service (AFS), age at first lambing (AFL), ewe productivity efficiency (EPE), inter lambing period (ILP) and lifetime productivity of the ewes must be calculated and reported.	Recommendation implemented. Reproductive parameters are calculated. Average age at first lambing (AFL) was 662 days in Marwari, 579 days in Muzzafarnagri, 624 days in Deccani and 715 days in Nellore sheep. PIs reported that efforts are being made to achieve the target.
7. For effective monitoring and implementation of the technical programme the Project Coordinator and scientist of the project in the coordinating unit should visit each unit at least once a year.	Recommendation implemented. Project Coordinator and scientist involved in the project made visit to units for effective monitoring.
8. Standard format for database of growth, reproduction, wool production, wool quality parameters and inventory, etc. shall be prepared by the PC cell and supplied to the units. Data generated under the project may be provided to the coordinating units by March, 2015 positively by all the units, electronically.	Recommendation implemented. Format for database was provided to the units.

9. In field units, care must be taken to avoid inbreeding by not supplying rams from same sireline to the same farmer.	Recommendation implemented by the PIs.
10. To improve the reproductive performance of flocks in farm units, the target of 95% lambing on ewes available basis should be achieved by March, 2017. CSWRI, Avikanagar will provide the necessary guidance, training and technical inputs to the farm units.	Recommendation implemented. All necessary efforts are being made by the PIs to achieve the target of 95%. Present status of lambing percent is 87.15 in Marwari, 88.30 in Muzzafarnagri, 90.06 in Deccani and 84.13 in Nellore sheep farm units.
11. Both farm and field units are advised to use anthelminthic drenching judiciously to prevent the development of drug res istance in worms. Unit incharges are requested to consult for technical information and training to Head, Animal Health Division, CSWRI or nearest unit involved with gastrointestinal parasitism of sheep under All India Network Programme on Gastrointestinal Parasitism.	Recommendation implemented. PIs were advised to use anthelminthic drenching judiciously.
12. All units are requested to use electronic weighing balances to increase the accuracy in body weight recording.	Recommendation implemented.
13. Performance recording, evaluation and reporting of the field flocks should be continued to know the improvement in the farmers' flock and socio. economic impact analysis of the project should be carried out by the units.	Field performance recording was started by Muzzafarnagri, Nellore and Deccani farm units. Impact analysis was started by Madras Red field unit. Marwari unit yet to start the field recording.
14. New MoU's between coordination institute and University/NGOs may be drawn for each plan for each continuing and new centres/units.	MoU for XII Plan already made between coordination institute and University.
Specific recommendations:	
Farm Based Units under NWPSI	
Marwari Unit:	
1. Sale of rams should be increased to fulfil the target.	Recommendation implemented. A total of 77 rams and 28 hoggets were sold.
2. Efforts must be directed to reduce the age at first lambing (AFL) by mating all the ewes (>12 months age having optimum weight for mating) either by natural or by inducted oestrous.	Recommendation implemented. Efforts are taken to reduce the age at first lambing from 662 days.
Muzaffarnagari Unit:	
1. Efforts should be made to improve the reproductive performance of the flock. Efforts must be directed to reduce the age at first lambing (AFL) by mating all the ewes (>12 months age having optimum weight for mating) either by natural or by inducted oestrous.	Recommendation implemented. Appropriate action was taken to reduce the age at first lambing and improve lambing performance. AFL of 579 days was achieved.
2. Budget allocated should be utilized fully for proper implementation of the technical programme.	Recommendation implemented. 96% (19.72 lakhs out of 20.50 lakhs) of funds has been utilized during 2014-15.

Deccani Unit:	
1. Immediate and appropriate measures may be taken to improve growth and overall performance of the flocks.	Recommendation implemented. Necessary measures are taken by the PI to improve growth and overall flock performance during 2014-15.
2. Breeding rams must be sol d on book/ sale value basis. Free distribution of rams should be stopped immediately.	Recommendation implemented. During 2014-15, a total of 36 rams were sold and 30 rams were distributed.
3. Old age ewes must be culled immediately.	Recommendation implemented by the unit.
4. Selection criteria and selection index, if needed, must be revised and used for selection of rams and improvement of the flock.	Recommendation implemented. Body weight at six month is used as criteria for selection.
5. Efforts must be directed to reduce the age at first lambing (AFL) by mating all the ewes (>12 months age having optimum weight for mating) either by natural or by inducted oestrous.	Recommendation implemented. Efforts are made to reduce the AFL from 624 days.
Nellore Unit:	
1. Efforts must be directed to reduce the age at first lambing (AFL) by mating all the ewes (>12 months age having optimum weight for mating) either by natural or by inducted oestrous.	Recommendation implemented. Efforts are being taken to reduce the age at first lambing from 715 days.
2. Selection criteria and selection index, if needed, must be revised and used for selection of rams and improvement of the flock.	Recommendation implemented. Preliminary selections done on the basis of three month weight followed by final selection at six months.
Field Based Units under NWPSI	
Madras Red Unit:	
1. For purchase of rams from field minimum standards such as minimum body weight at a cut off age be ensured so that best germplasm is selected.	Recommendation implemented.
2. More number of ewes should be covered to achieve the target.	Recommendation implemented. Lambing details of 5206 ewes were recorded during 2014-15.
Magra Unit:	
1. Baseline survey should be done in the adopted villages as per the format and performa developed by NBAGR, Karnal.	PI informed that survey is under progress and details will be presented during the review meeting.
2. More numbers of rams should be distributed to cover more number of ewes in the field.	Recommendation implemented. 98 Magra rams were distributed.
3. Identification and performance recording of progeny with respect to growth, reproduction, wool yield and quality needs to be started on priority basis.	PI informed that identification and performance recording are under progress
4. For purchase of rams from field minimum standards such as minimum body weight at a cut off age be ensured so that best germplasm is selected.	Recommendation implemented.

6. PROJECT TEAM

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