

**Nimbkar Agricultural Research Institute (NARI)**  
**Animal Husbandry Division (AHD)**  
**Annual Research Report**  
**2022-23**

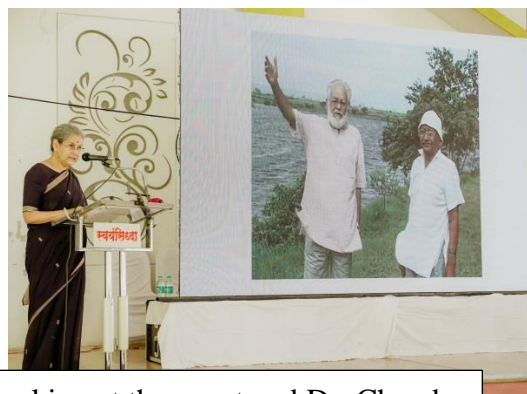
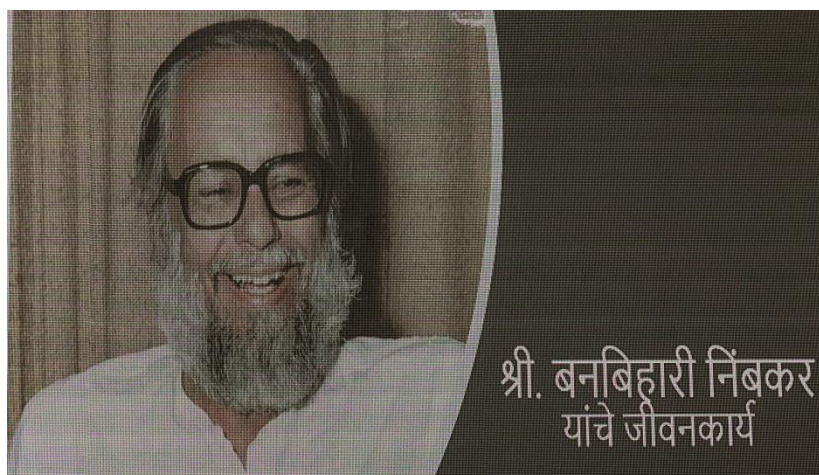
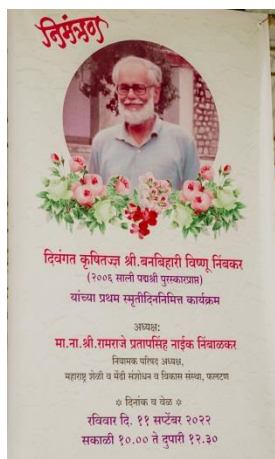
Report written by: Dr. Chanda Nimbkar, Director, Animal Husbandry Division, NARI



I write with great sadness that a long-standing collaborator of NARI-AHD and a valued personal friend and colleague Dr. G.D. (Douglas) Gray, formerly of the University of New England, NSW, Australia, passed away on 20 July 2023. Dr. Douglas Gray was the progenitor of the first major international project carried out by the NARI-AHD, “Prolific worm-resistant meat sheep for Maharashtra, India” (1994-97) with funding from the Australian Centre for International Agricultural Research (ACIAR). It was during his visit to NARI-AHD in 1993 as a representative of ACIAR that the idea of the project first came up. This project led to more follow-on projects funded by ACIAR until 2007. The achievements of these projects, mainly the development of the prolific and adapted NARI Suwarna sheep breed and related research brought national and international recognition to NARI-AHD and helped to establish NARI-AHD as a centre of excellence in sheep breeding and small ruminant parasitology research. Douglas was well-loved by all the staff of NARI-AHD because of his warm, open and charming personality. He gave freely of his professional knowledge and insight and enriched us. We will carry on Dr. Gray’s legacy into the future.

### **Highlights**

- The first death anniversary of the late Shri B.V. Nimbkar, the founder of NARI, was on 25 August 2022. A public event was held by his family and the NARI AHD on 11 September 2022 at the Maharaja Mangal Karyalay, Phaltan to commemorate his pioneering work in agriculture and animal husbandry. Hon'ble Shri. Ramraje Naik Nimbalkar, chairman of the governing council of the Maharashtra Goat and Sheep Research and Development Institute presided over the event. The introductory speech was made by Shri Arvind Mehta, well-respected reporter from Phaltan and a friend of Shri Nimbkar’s. Dr. Chanda Nimbkar and Ms. Madhura Rajvanshi gave a narrated slide show based on the major events in Shri Nimbkar’s life and his achievements. Dr. Anand Karve and Shri. Vijay Kolte then gave lectures on Shri Nimbkar’s work in the fields of agriculture and animal husbandry respectively. Dr. Nandini Nimbkar gave a speech expressing the Nimbkar family’s gratitude to all the people of Phaltan and other places who cooperated with Shri Nimbkar in his work throughout his life. A vote of thanks was given at the end by Ms. Madhura Rajvanshi. Shri Rajendra Pawar of the Agricultural Development Trust, Baramati and Shri Raghunathraje Nimbalkar were among the many friends and associates of Shri Nimbkar who were present at the event.



Hon'ble Shri. Ramraje Naik Nimbalkar speaking at the event and Dr. Chanda Nimbkar giving a presentation at the event.



Current and past staff members of NARI AHD who helped at the event.

- The Senior Veterinarians' Foundation (Jyeshtha Pasuvaidya Pratishthan) Maharashtra, Pune annually gives awards to outstanding livestock breeders and veterinarians. Shri Vasantao Jahagirdar, a trustee of the Maharashtra Goat and Sheep Research and Development Institute and a close associate of the late Shri B.V. Nimbkar and the Nimbkar family gave a donation to the Pratishthan to institute **two new awards from 2022, one for an 'outstanding goat breeder' and one for an 'outstanding sheep breeder' in the name of the late Shri B.V. Nimbkar** (Padmashri awardee in 2006). Eligible goat and sheep breeders had to apply for this award. The two candidates selected by the Pratishthan for these awards were Shri Bapu Dilip Keskar, of Rajale, Tal. Phaltan (outstanding goat breeder) and Shri Bandopant Balu Haral of Khupire, Karveer, Dist. Kolhapur (outstanding sheep breeder). They received the awards in a function in Pune on 29 May 2022. Shri Keskar has been rearing Boer goats under a stall-feeding system for

the past twelve years while Shri Haral has been rearing Nari Suwarna and Deccani sheep for eight years successfully in the high rainfall area of Karveer.

Epaper link- <https://sthairya.com/padma-shri-shri-bv-nimbkar-outstanding-goat-breeder-sheep-breeder-award-2022-shri-bapu-dilip-keskar-and-shri-provided-to-bandopant-balu-haral/>

- A short biography of **Dr. Chanda Nimbkar, the Director of Nimbkar Agricultural Research Institute, Animal Husbandry Division** was included in the book **Vigyan Vidushi** (<https://vigyanprasar.gov.in/product/vigyan-vidushi/>) published by Vigyan Prasar, an autonomous organization under the **Department of Science and Technology, Government of India**. The book portrays the contribution to science of 75 Indian women scientists and was published on the occasion of 75 years of Indian Independence.
- Dr. Chanda Nimbkar was honoured with the ‘STREE 2020’ national award on 26 March 2023 in a function at the Lady Ramabai Hall at S.P. College in Pune by the organization Sharada Shakti (Western Maharashtra) which works for the empowerment of women through science and technology.



Dr. Shekhar Mande, national president of Vidnyan Bharati conferring the Stree 2020 award on Dr. Chanda Nimbkar

From L to R: Smt Leena Bavdekar, Dr. Shekhar Mande, Dr. Sudha Tiwari, Dr. Chanda Nimbkar, Mrs. Monica Mohite, Dr. Sangeeta Kale

- On 6-16 June 2022, Dr. Pradip Ghalsasi, Associate Director, AHD, NARI was invited by “Feed the Future Knowledge-based Integrated Sustainable Agriculture in Nepal (KISAN II)” to conduct a training course on “Artificial Insemination in Goat: extraction, processing, storage and transport of frozen buck semen”. He also visited National Livestock Breeding Organizations (NLBO) in different provinces of Nepal to observe the process of buck semen collection, processing, storage and supply carried out by them and guide them to improve their operations. KISAN II has partnered with the Nepal government Department of Livestock Services (DLS) and conducted multiple training courses on artificial insemination in goats for technicians, imported frozen Boer goat semen from USA and is in the process of supporting NLBOs to

strengthen their production and supply of quality Boer semen. Dr. Pradip Ghalsasi and his team members Mrs. Padmaja Ghalsasi and Mr. Rupsing Karnvilkar carried out the training program and related tasks successfully.

Overall, all the participants including the Director General of the DLS and other government officials were highly impressed with NARI's team, the training sessions and support to improve the operations of the NLBO laboratories in Banke and Pokhara.

- It is a great achievement of NARI AHD that the Nari Suwarna sheep breed developed by the AHD has begun to spread in Karnataka widely. The Karnataka government has now approved the establishment of a Nari Suwarna breeding centre and sanctioned Rs.1 crore funds to establish it. A place has been selected in Kopal district for the proposed breeding centre. Mr. Mahesh Mirajkar of Belgavi has established a farm with 100 NARI Suwarna homozygous ewes and is planning to start a North Karnataka NARI Suwarna Breeders' Association.
- NARI-AHD bought a new 'straw filling and sealing machine (MRS-1 Dual V2)' with its standard accessories (IMV Technologies), worth Rs.23,62,500/- for its frozen semen laboratory.



Shri Kanhaiyya Chavan operating the new straw filling and sealing machine

- For the first time since the establishment of the frozen semen laboratory at NARI, AHD in 2012, the laboratory staff at AHD carried out the complete procedure of freezing of buck semen in the absence but under the guidance of Dr. Pradip Ghalsasi. This year, **the staff have frozen a total of 2781 Boer, 1449 Osmanabadi, 561 Damascus and 63 Awassi ram doses of semen.** Dr. Ghalsasi found all the semen doses to be excellent in his evaluation. We applaud the efforts taken by the whole team which includes Shri Kanhaiyya Chavan, Ms. Sanyogita Kumbhar, Ms. Karishma Shaikh, Mr. Dattatray Mulik, Mr. Rupsingh Khanvilkar and Mr. Malhari Dhembare.





Semen freezing team carrying out all the steps of freezing buck semen

- On 4 May 2022, Dr. Nandini Nimbkar, President, NARI and some staff members of NARI head office visited NARI-AHD on AHD's invitation to obtain information on the AHD's activities.
- During 2022-23, five staff meetings were held at NARI-AHD. All staff members participated in these meetings chaired by Dr. Chanda Nimbkar and co-chaired by Dr. Pradip Ghalsasi and many issues were discussed for better stream-lining of work. Planning was done for continued plentiful fodder availability at AHD's farms and the staff members gave suggestions for better coordination.

### **Project I. Osmanabadi Goat Field Unit of the ICAR-All India Coordinated Research Project on Goat Improvement**

**Funding agency:** Indian Council of Agricultural Research (ICAR), Government of India, New Delhi, administered by the Central Institute for Research on Goats, Makhdoom, Via Mathura, U.P.

**Scientists:** Dr. Chanda Nimbkar, Dr. Pradip Ghalsasi

**Technical staff:** Mr. Kanhaiyya Chavan, Mr. Navnath Patange, Ms. Sanyogita Kumbhar, Ms. Karishma Shaikh (until 12 November 2022), Mr. Sagar Shinde, Ms. Minakshi Ghorpade (in Dhakale, Tal. Baramati, Dist. Pune), Mr. Mithu Garje (Sakat and Gandhanwadi, Tal. Jamkhed and Patoda, Dist. A'Nagar and Beed respectively).

#### **Executive summary:**

- An Osmanabadi goat field unit was established at NARI in April 2009 under the AICRP on Goat Improvement. NARI is the only non-government organization (registered public charitable trust and society) running a field unit in the history of AICRP. During the period 1 April 2022 to 31 March 2023, the production performance of goats in farmers' flocks was assessed in the low rainfall, drought-prone Deccan plateau regions of five districts in Maharashtra State. Viz. Ahmednagar, Beed, Pune, Satara and Solapur districts.
- Six hundred sixty eight adult does (93 in Ahmednagar, 55 in Beed, 174 in Pune, 40 in Satara and 306 in Solapur districts respectively) are being recorded. These belong to 125 goat keepers, indicating that the average number of adult does reared per household is 5.34. Regular detailed recording has been done of their body weight, milk yield, reproduction, kid weights, mortality, morbidity, cost incurred for goat rearing and income earned.
- In 472 kiddings, 766 Kids were born during 1 April 2022 to 31 March 2023, making the average litter size 1.62. The closing balance is 1290 goats in total (comprising 316 males and 974 females). Overall mortality was 1.35%.
- The total number of superior Osmanabadi bucks purchased since 2009 is 96, 24 of which were sired by selected breeding bucks provided by the Osmanabadi Field Unit and seven purchased from areas outside the project to increase diversity and minimize inbreeding. Four Osmanabadi bucks were purchased during the year 2022-23 out of which, three are sired by the superior Osmanabadi bucks disseminated by the Osmanabadi Field Unit.

- v. **Total 55,407 Straws (0.25 ml French mini straws) of frozen semen of 76 Osmanabadi** bucks have been produced so far in NARI's Buck Semen Freezing Laboratory from January 2012 to 31 March 2023. From 1 April 2022 to 31 March 2023, 4642 Osmanabadi buck straws were frozen and of these, 3624 Osmanabadi buck straws were supplied to A.I. technicians, farmers and entrepreneurs for breeding Osmanabadi goats. Conception rates reported by field AI technicians are 50-55%.
- vi. The average 3, 6, 9 and 12-months weights of Osmanabadi kids born during April 2022 to March 2023 under the Field Unit are 11.8 kg, 16.2 kg, 19.7 kg and 22.5 kg respectively. These average weights are very high and reflect the good genetic quality of the animals as well as the high standards of feeding and management because of the efforts taken by NARI over the last 14 years.
- vii. The Osmanabadi Field Unit has improved the least squares mean 90-day milk yield of Osmanabadi does which is now 105.3 kg (1713 records). This was measured using the weigh-suckle-weigh method. This establishes the Osmanabadi breed to be among the top five dairy goat breeds in India. The least squares mean 90-day milk yields of does having singles, twins and triplets were 68.1, 105.4 and 138.8 kg respectively, indicating that milk yield increases with the number of kids. The heritability of 90-day milk yield was estimated to be  $0.10 \pm 0.16$ .
- viii. We have published 16 information booklets/leaflets in Marathi language to give information to goat keepers on better goat management practices.
- ix. Preventive health care of goats was undertaken in all villages and vaccinations, deworming and spraying against ecto-parasites were regularly carried out in all participating villages.
- x. Goat keepers are benefiting from castration of males unwanted for breeding, carried out by Project staff. This has reduced undesirable accidental mating and has also eliminated the problem of very early breeding of young does.

### Salient Achievements

- i. Due to the good management and condition of goats in participating villages, there were **no contagious ecthyma cases in goats in two out of five clusters** although the outbreak was severe in neighbouring villages not adopted by the Osmanabadi Field Unit. In those clusters where contagious ecthyma cases were found, 13 to 54% of the goat flocks were affected and 7.5 to 27.5% of the goat does and kids were affected. However, due to our major awareness creation campaign about treatment supported by the booklet published by us, all affected animals recovered and **there was no mortality as a consequence of contagious ecthyma**.
- ii. Due to NARI's awareness creation, goat keepers under the Osmanabadi Field Unit have realized the importance of using feeders for goats. 112 out of 125 participating goat keepers have fabricated mild steel feeders and are using them. 70% of participating goat keepers stall-feed their goats. All goat keepers in four villages (Morochi, Dhakale, Gosaviwadi, and Gandhanwadi) have feeders. This has helped in reducing feed wastage and goats receive unsoiled fodder.
- iii. NARI's awareness creation has also led more than half the goat keepers under the Osmanabadi field unit to start making maize silage in 3 to 5 tonnes silage bags and feeding it to their goats along with cows.
- iv. Participatory goat keeper Mr. Tukaram Thombare from Morochi prepared 800 kg Lucerne and Desmanthus shed dried hay with NARI's advice. This hay is relished by goats as a supplementary feed. Other goat keepers usually follow his practices; so they will also start preparing hay.
- v. NARI has established a relationship with the well-known Pune-based NGO AFARM. NARI tested faecal samples of 43 goats belonging to 22 goat keepers associated with AFARM in 11 villages of Mann Taluka to the south of Phaltan taluka. NARI gives them advice on deworming and correct use of dewormers.

- vi. Four Participating goat keepers from village Morochi jointly purchased a baby castrator for castration of their male kids in their flocks to avoid unwanted mating of their goats. NARI has taught them the proper technique of castration.
- vii. Goat farmers have now realized the importance of feeding adequate dry matter to their goats. They have stored crop residues of Soyabean for feeding their goats which they used to burn otherwise. This could be achieved due to NARI's continuous awareness program.
- viii. NARI's continuous public awareness creation for feeding nutritious fodder resulted in 59% (78 out of 132) of participating goat keepers starting to grow their own fodder which will be sufficient for their goats for the whole year.
- ix. **During the year, 91 goats** including 29 adult does and 4 adult bucks, 30 male kids and 28 female kids **were sold by participatory goat keepers for breeding at higher prices.** All the male and female kids sold were sired by 18 superior Osmanabadi bucks supplied by the Field Unit. These goats were purchased for breeding by rearers in 6 villages outside the project. Thus genetic improvement achieved in the project is disseminated over distances of 30 to 140 km from project villages.
- x. **Performance recording of more than 12,000 Osmanabadi goat does and their progeny over the last twelve years** has led to selection of fast-growing twin- or triplet-born males produced by high milk-yielding does with superior reproductive performance. **Breeding values of bucks for 6 to 9-month weights are now estimated,** based on weights of 15 to 40 progeny per buck. High-breeding-value unrelated males are used for breeding in project villages and frozen semen of high breeding value progeny-tested bucks is disseminated in areas outside the project through a network of AI technicians. **The Osmanabadi Field Unit has thus established an effective model of genetic improvement and its dissemination.**
- xi. After seeing the results of the project such as excellent, fast growing kids and drastic reduction in mortality and morbidity, some **goat keepers** earlier opposed to ear tags, have enthusiastically embraced ear tags and are **taking interest in the recording and weights of their kids.** A few goat keepers have started keeping records in notebooks or on a calendar in their house. This helps them to check predicted kidding dates and weight gain in kids.
- xii. Local butchers mention that **meat quality of kids born to NARI's superior bucks is better and consumers prefer this meat.** This could be due to higher live weight and higher proportion of meat compared to bones. They also mention about healthy carcass and this could be due to regular vaccination and timely treatment.
- xiii. **The proportion of Osmanabadi true-to-type goats in the Project villages has increased to 95% now.** Goat keepers have retained for breeding the good does sired by the improved bucks in the project. Goat keepers have stopped using Sirohi or other local bucks for breeding their goats. They have thus started contributing to the genetic improvement of Osmanabadi goats, which is the main objective of the AICRP Goat Improvement.
- xiv. There is **substantial improvement in the incomes of goat keepers** due to reduced mortality, better health of goats and kids and consequently less expenditure on health care and knowledge of kid weights which enables calculation of the expected sale price.



*Castration of scrub buck*



*Length measurement*



*Kid weighing*



*Vaccination*

**Project II. Increasing profitability of sheep production by genetic improvement using the *FecB* (Booroola) mutation and improved management in conjunction with the Project for Dissemination of *FecB* carrier sheep to Karnataka, Telangan and Andhra Pradesh.**

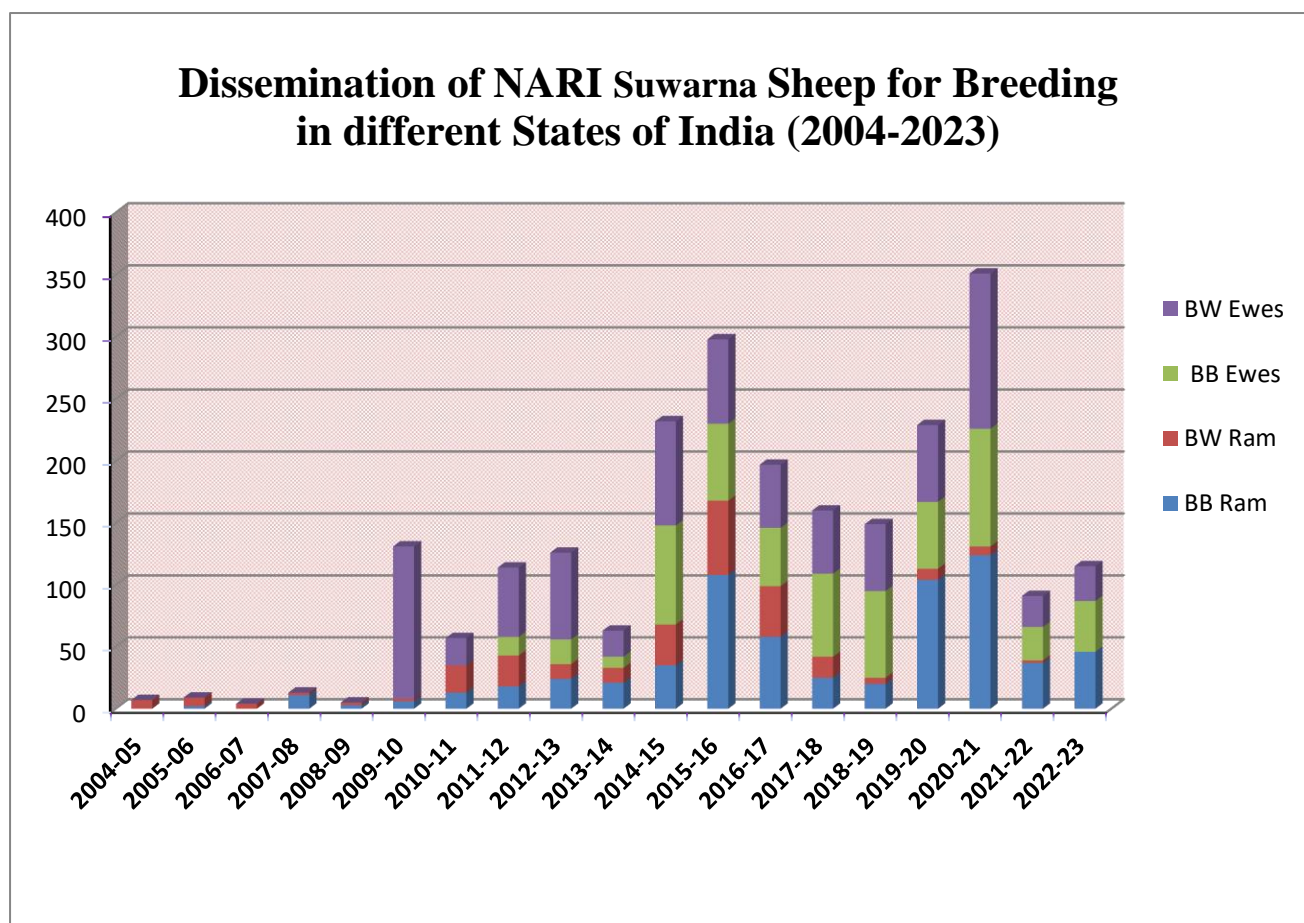
**Scientists:** Dr. Chanda Nimbkar, Dr. Pradip Ghalsasi

**Technical staff:** Mr. Kanhaiyya Chavan, Mr. Anil Chavan, Mr. Dattatray Mulik, Mr. Dilip Bhandare, Mr.Sagar Shinde and Ms. Karishma Shaikh (until 12 November 2022)

**This successful breeding programme has continued to be self-sustaining since 2012, by generating income mainly from the sale of breeding rams and ewes and secondarily from the sale of surplus lambs and cull sheep.**

**A. Breeding programme**

A new strain of Deccani sheep has been developed, called ‘NARI Suwarna’ that gives about 40-50% higher lamb production due to a 50% higher litter size compared to local Deccani sheep. The growth rate, mothering ability and conformation of the new breed were improved by the introduction of the Madgyal and Awassi breeds and continuous selection is being carried out to improve these traits further. The breed has been disseminated to shepherds in Maharashtra, Karnataka, Telangan and Andhra Pradesh and they are profiting from its use. Total **923** breeding rams and **1428** breeding ewes have been supplied. Out of these, **46** rams and **69** ewes were supplied during 1 April 2022 to 31 March 2023. Majority of the rams and ewes were purchased by sheep keepers from Karnataka and a few from Maharashtra and Telangan.



All ewes are bred by artificial insemination (AI) in order to use a large number of breeding rams to maintain diversity and control inbreeding and maintain accurate pedigree records. Each of the two AI programmes in 2022-23 went on for one month, roughly covering two oestrus cycles. Ewes were inseminated in natural oestrus detected by vasectomised teaser rams. All ewes were inseminated cervically once, about 5-6 hours after oestrus detection. Ewes were inseminated with fresh, diluted semen of the allotted rams. The overall conception rate of 80.77% indicates the high standard of practices used for the AI programme and the good condition of ewes and rams. Genetic analysis was used to estimate breeding values.

**Table 1. Results of four AI programs carried out at NARI's Lundy farm, Rajale in November 2021, February 2022, May 2022 and August 2022.**

Particulars	Ewe's <i>FecB</i> genotype			Overall
	<i>FecB</i> <sup>BB</sup>	<i>FecB</i> <sup>B+</sup>	<i>FecB</i> <sup>++</sup>	
Ewes inseminated artificially (AI)	116	180	21	317
Ewes conceived (first and second AI)	81	157	17	255
Conception rate to first AI (%)	68.1	82.2	71.4	76.3
Pregnant ewes died	1	3	0	4
Ewes aborted	5	17	2	24
Ewes lambed with at least one live lamb	74	133	15	222
Ewes lambed with all lambs stillborn (possible dystocia) or died soon	1	4	0	5
Total live lambs born	132	203	16	351
Live lambs born per ewe lambed with at least one live lamb	1.78	1.53	1.07	1.58
Live lambs born per ewe conceived	1.63	1.29	0.94	1.38

The conception rate to artificial insemination of 80.77% was slightly lower than last year. However, there was a substantial increase compared to 2021-22 in the number of live lambs born per ewe lambed (increase from 1.53 to 1.78 for homozygous ewes and from 1.42 to 1.53 for heterozygous ewes). The number of lambs born per ewe conceived also increased (from 1.15 to 1.63 for homozygous ewes and from 1.16 to 1.29 for heterozygous ewes). This was the result of a reduction in abortions from 17% to 10%. This indicates the success of our improved management practices and strategies and our farm supervisors' and labourers' hard work. The advantage of twin-bearing ewes over single-bearing ewes can still be clearly seen as the range of weight of lamb weaned by twin-bearing ewes (when both lambs survived to weaning age) was 32.2 to 43.5 kg at 4 months age compared to 18.5 to 26 kg for single-bearing ewes.

There is evidence that our selection strategy is also working. We now have a number of top class ewes that have twin lambs and rear them to 16 kg weight each by the age of 3 months. The popularity of the NARI Suwarna breed among sheep owners in Karnataka, Telanagan and Andhra Pradesh also indicates the superior productivity of the breed.

Dr. Chanda Nimbkar analysed the litter size data of NARI Suwarna from 2009 to 2022 and submitted a paper based on this analysis to the 25th conference of the Association of Advancement of Animal Breeding and Genetics held in Perth, Australia on 26-28 July 2023. She found that ewes heterozygous and homozygous for the *FecB* mutation wean 50% more lambs per ewe lambing and conceived, than non-carrier ewes. The introduction of *FecB* and further selection for other traits is thus an effective pathway for sustainable intensification of sheep rearing on the Deccan plateau.



NARI Suwarna flock and a NARI Suwarna ewe with twins at AHD's sheep farm at Rajale

### B. Genotyping of sheep DNA at the *FecB* locus

**Table 2.** *FecB* genotypes of NARI-AHD's sheep tested at the AHD laboratory during April 2022 to 31<sup>st</sup> March 2023.

Breed	Number of animals genotyped	<i>FecB<sup>BB</sup></i>	<i>FecB<sup>B+</sup></i>	<i>FecB<sup>++</sup></i>
Crossbred NARI Suwarna lambs*	310	171	139	0
Awassi lambs	8	-	8	-
<b>Total</b>	<b>318</b>	<b>171</b>	<b>147</b>	<b>0</b>

\*There was no discrepancy found between genotypes of parents and progeny.

The *FecB* genotyping protocol is now **fine-tuned and cost-effective** and **100%** results were obtained at the first go in all the genotyping tests conducted this year also.

**Table 3.** *FecB* genotypes of blood samples received from outside NARI

Source of samples	Breed	Number of animals genotyped	<i>FecB<sup>BB</sup></i>	<i>FecB<sup>B+</sup></i>	<i>FecB<sup>++</sup></i>
Project Mesha, Aga Khan Foundation. Muzaffarpur, Bihar.	Black Bengal goats	56	-	-	56
	<b>Total</b>	<b>56</b>	<b>0</b>	<b>0</b>	<b>56</b>

We acknowledge the valuable help and guidance of Mrs. Sheetal Ranade who is our consultant and adviser for the *FecB* DNA test.

**Project III. Setting up a State of the Art A.I. Centre for sheep and goats under the National Livestock Mission Scheme under the component of 'Interventions towards productivity enhancement'.** (This project was originally sanctioned under the Central Sector Scheme – Integrated Development of Small Ruminants and Rabbits).

The project was submitted to the Government of India, Ministry of Agriculture, Department of Animal Husbandry, Dairying and Fisheries under Central Sector Scheme – Integrated Development of Small Ruminants and Rabbits on 21 August 2010 through Commissioner,

Animal Husbandry Maharashtra State. The proposal was approved for 100% Central Government assistance by the Government of India, Ministry of Agriculture, Department of Animal Husbandry, Dairying and Fisheries vide their administrative approval letter No. 48-51/2010-TS/Sheep dated 24 November 2010.

The total project amount was received in five installments from October 2011 to August 2016. An audited utilization certificate of the last installment was submitted to the Deputy Commissioner, Satara District, Animal Husbandry, Maharashtra State on 28 April 2017.

**1. Date of commissioning of the semen freezing lab:** 2 January 2012

**2. Production and utilization of buck frozen semen doses during the period January 2012 to 31 March 2023.**

We established a standard protocol for freezing of buck semen and started producing frozen semen straws since June 2012. These straws are regularly supplied to State Governments and private customers and excellent conception rates of average 50% are being achieved.

**Table 4. Number of buck frozen semen straws produced and used during June 2012 to 31 March 2023.**

Type of buck semen doses	Breed of buck					Total
	Boer	Osmanabadi	Damascus cross	Alpine and Saanen X Beetal	Beetal	
Frozen	42,093	54,828	7,412	1477	440	1,06,250
Supplied	34,534	51,823	5,910	1453	343	94,063
Used for AI of NARI and MGSRDI Farm and local goat keepers' goats brought to NARI and given free to AI technicians for trial	5,106	836	420	24	5	6,391
In storage	2,453	2,169	1,082	0	92	5,796

- 500 frozen semen straws of Osmanabadi bucks were given for breed conservation to the National Bureau of Animal Genetic Resources (NBAGR), Karnal, Haryana under the technical programme of the Osmanabadi field unit at NARI-AHD under the ICAR-All India Coordinated Research Project on Goat Improvement.
- **2709 goats belonging to farmers from surrounding villages and 3,682 goats of the Institute have so far been artificially inseminated using these frozen semen straws.**
- Goat keepers from nearby villages bring their goats in oestrus to NARI farm for cervical AI. AI technicians who used to carry out AI of only cows and buffaloes belonging to farmers, have started to take buck frozen semen from NARI and carry out AI of does at the farmers' door. During the year 2022-23, (1 October 2021 to 31 October 2022) 54 goat does belonging to local goat keepers were inseminated, out of which 43 could be followed up and 28 kidded. Thus the conception rate to A.I. was 65.12%. This is a high conception rate

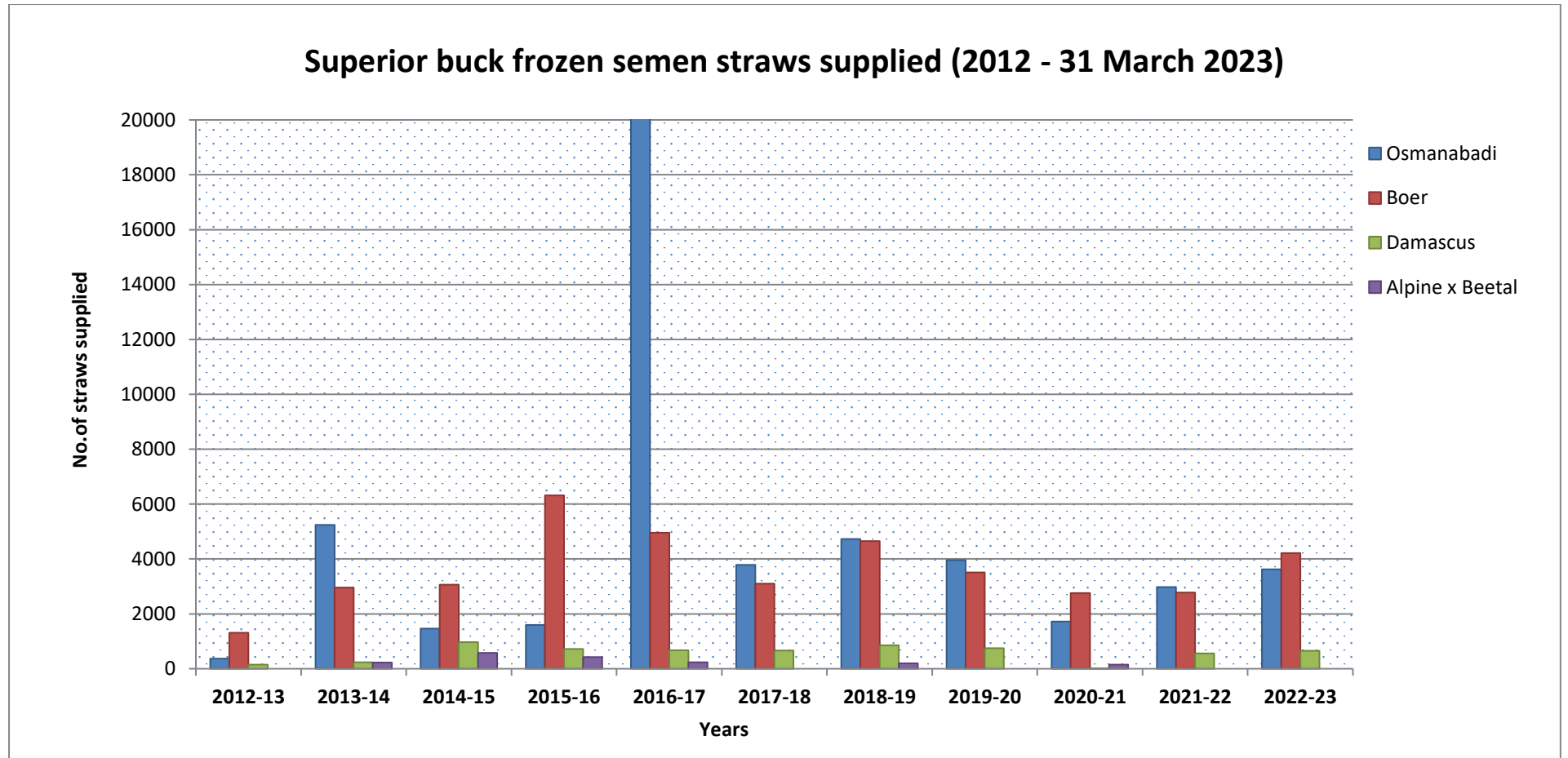
and reflects the high semen quality as well as the skill of our farm supervisors/inseminators. Conception rate results for the last ten years (2012-22) are given in Table 5.



**Artificial insemination of local goat keeper's goat at AHD farm, Wadjal**

**Table 5. Results of AI of farmers' goats using frozen buck semen on NARI farms**

<b>Farm / Field</b>	<b>No. of goats inseminated</b>	<b>No. of goats monitored</b>	<b>No. of goats conceived</b>	<b>Conception rate (%)</b>
NARI Farms (October 2021- October 22)	54	43	28	65.1%
NARI farms (2012- October 2022)	1,393	1,107	555	50.0%



1. 2016-17: 20,000 Osmanabadi semen straws supplied to Government of Karnataka.
2. 2020-21: Straw procurement reduced due to the Covid19 pandemic

## Training in goat artificial insemination

During 2022-23, two courses were conducted; one for Pashusakhis of Manndeshi Foundation, Mhaswad and another for Samaj Pragati Sahyog Sanstha, Nagpur. Mr. Kanhaiya Chavan conducted the training under the guidance of Dr. Pradip Ghalsasi and with the help of former staff member Rupsing Khanvilkar as well as other NARI staff members.

1) In the training course of Manndeshi Foundation, Mhaswad, Taluka Mann, Dist. Satara ten participants were given a three days' refresher intensive training course (including theory and practicals) on 'Goat Management, first aid and artificial insemination'. The Pashusakhis came from different villages of Satara, Latur, Nashik and Solapur districts.



Training conducted for Pashusakhis of Manndeshi Foundation, Mhaswad,  
Taluka Mann, Dist. Satara.

2) In the training course of Samaj Pragati Sahyog Sanstha, eighteen participants were given a four days' training course (including theory and practicals) on 'Goat Management and artificial insemination'. The participants came from different villages of Wardha, Amravati and Yavatmal districts. An extension visit was organized for them to Dhakale village adopted by NARI under the ICAR-AICRP, Goat improvement. Dr. Chanda Nimbkar guided the trainees during the visit.



Training conducted for Samaj Pragati Sahyog Sanstha, Nagpur

### Total training courses conducted by NARI-AHD

**Table 6. Training courses and classification of participants (2007- March 2023)**

Topic of training	No. of training courses	No. of participants			Total
		Vets	Para-vets and pashu/sheli sakhis	Farmers	
Goat Artificial insemination (AI)	71	306	175	251	803
Goat and sheep production and management	16	57	52	87	212
Goat and sheep management including AI	22	138	79	3	242
Goat and sheep first-aid including AI	10	0	81	156	247
Total	119	501	387	497	1504

**Project IV. Research in veterinary parasitology with special reference to sheep and goats.****Funding agency:** In Internally funded**Scientists:** Dr. Chanda Nimbkar, Dr. Pradip Ghalsasi**Technical staff:** Ms. Karishma Shaikh (until 12 November 2022), Ms. Sanyogita Kumbhar, Mr. Dilip Bhandare, Mr. Datta Mulik, Mr. K.M. Chavan, Mr. Sagar Shinde, Mr. Anil Chavan.

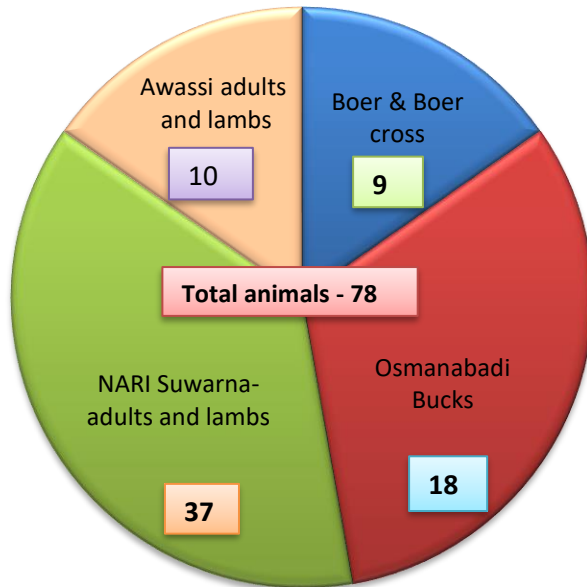
We monitored faecal worm egg counts (FEC) and FAMACHA scores of our sheep and goat flocks to assess the gastro-intestinal nematode (GIN) worm burden under natural infection. Samples of goat flocks of goat keepers participating in the Osmanabadi Goat Field Unit under the ICAR-AICRP Goat Improvement project were also monitored. We have been studying internal parasite burdens and parasite epidemiology in sheep and goats for more than 22 years. During the last 12 years, we have also included FAMACHA score monitoring as a part of our sustainable GIN control strategy. FAMACHA chart is an anaemia guide which indicates the seriousness of the burden of infection with blood sucking parasites. It can be effectively used especially when laboratory facilities are not available. Anaemia in sheep and goats is mainly caused by the parasite *Haemonchus contortus* which is the predominant species in our area.

The rainfall had major impact on prevalence of internal and external parasites. Worm infection was found to be heavy during the monsoon.

AHD maintains sheep and goats on three farms - Wadjal, Dhuldeo and Lundy farm (Rajale).

## Wadjal Farm

### Breed & number of animals ( April 2022 to 31<sup>st</sup> March 2023)



### Information about farm:

All animals are stallfed.



Rainfall during the year - 654 mm



Av. FAMACHA score : 2 to 2.5

Av. Body condition score : 2.5 to 3

During the year, FEC of all animals was measured four times and below are the observations.

(All animals were mass drenched only once in November 2022.)

#### 1) Osmanabadi Bucks-

FEC average: 350 epg

FEC range: 0-1000 epg

(only 40% bucks needed to be drenched individually whose FEC was >1000 epg and mostly those were transferred from outside villages to our farm.)

#### 2) Awassi - FEC average: 300 epg

FEC range: 0-1100 epg

(In Awassi lambed ewes periparturient rise in FEC not seen but tapeworm infection seen so drenched with Fentas Plus.)

#### 3) NARI Suwarna rams -

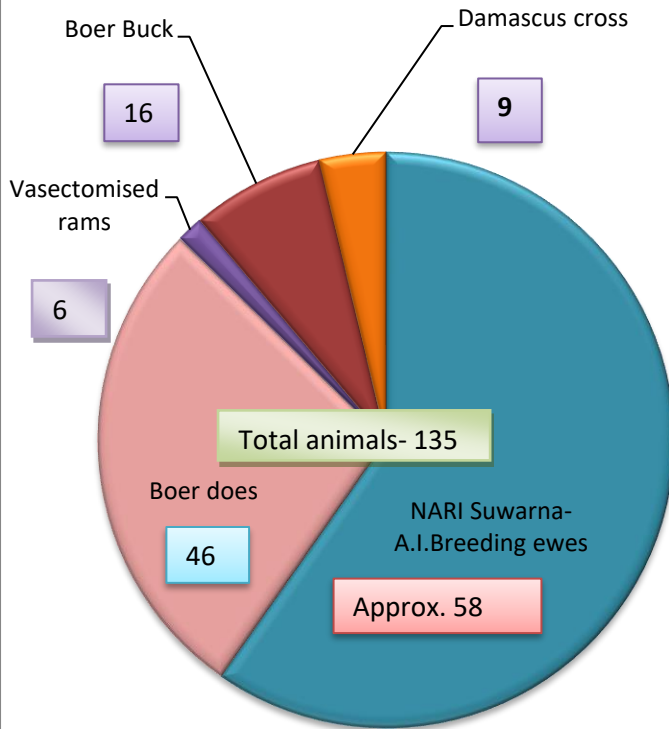
FEC average: 273 epg

FEC range: 0-1100 epg

(only 25% NARI Suwarna rams needed to be drenched individually.)

Overall observation is worm burden was not so high; maybe due to the dry climate, good nutrition, good management and all animals being stall-fed.

## Dhuldeo Farm Breed and numbers of animals (April 2022 to 31 March 2023 )



### Information about farm:

Goats are stall-fed.



Ewes are grazing.



Rainfall during the year - 681 mm



During the year, FEC of all goats was measured Six times and found as below:

**1) Goats** - FEC average: 1532 epg  
 FEC range: 0-2600 epg  
 (Mass drenching required only once )

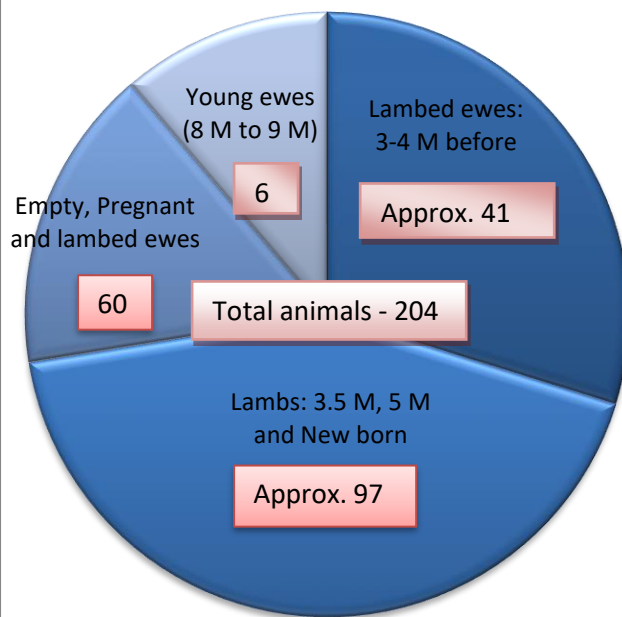
Only individual drenching of 8 goats in April 2022 and 19 goats in December and only 1 goat in January whose FEC was >1000 epg.

**2) NARI Suwarna Pregnant ewes-**  
 During the year, FEC of different groups was measured three times and found as below:  
 FEC average : 1899 epg  
 FEC range: 0-6000 epg  
 (Mass drenching required for two groups once with Albendazole and second with Hitek.)

overall FAMACHA Score: 2 to 2.5

overall Body condition score: 2.5 to 3

## Lundy Farm NARI Suwarna breed (April 2022 to 31<sup>st</sup> October 2022)



### Information about farm:

All animals are grazing



Total Rainfall - 720 mm



During the year, FEC was measured eleven times and found as below.

#### 1) 59 Empty ewes -

FEC average: 1924 epg

FEC range: 0-7300 epg

#### 2) 54 Pregnant ewes (1 week before lambing) -

FEC average: 2327 epg

FEC range: 100-13300 epg

#### 3) 67 Pregnant and lambd ewes-

FEC average : 4030 epg

FEC range: 300-8700 epg

(Each group of ewes was mass drenched once just after lambing with Closantel and once with Albendazole. Worm infection rises due to reduction in progesterone levels and the stress associated with lambing and suckling of lambs).

Only individual drenching of 26 lambd ewes and 28 pregnant ewes in October 2022 whose FEC was >1000 epg.

Lambs were mass drenched with Fentas Plus only once for tapeworm infection.

FAMACHA Score: 2 to 3

Body Condition Score : 2 to 3

- We check the FAMACHA scores of all animals every month at the time of weighing of animals and observed that **no animal had a FAMACHA score above 3**, which shows the good management and feeding.
- The lambed and pregnant ewes with FAMACHA score of 2.5 to 3 as well as high FEC were drenched individually and also given an iron injection.
- We checked the FEC of 210 goats of Dhakale village under AICPR project and found FEC range to be 1000-13,300 epg so all animals were drenched with Closantel in June 2022.
- In 2022-23, we observed that the proportion of *Trichostrongylus* was high compared to last year so after drenching with narrow spectrum anthelmintic we needed to drench with broad spectrum anthelmintic also.
- The immediate and sustained activity of Closantel which is long acting and narrow spectrum was tested at day 14, 28, 42 post-drench and found Closantel was fully effective up to 42 days.
- To ensure that animals on our farms are fed adequately, all the animals were **weighed every fortnight**. When there was weight loss, the feeding was altered. This year too incentives were given to the workers of those farms where animals in all groups present on the farm gained weight during a particular month. All 3 farms got incentives which means our management is improving day by day.
- Ecto-parasite infection was observed in sheep and goats during rainy season. Amitraz was used to treat this.
- Larval culture: The overall predominant larval species (almost 75%) in all the sheep and goat flocks identified from pooled faecal samples was *Haemonchus contortus* followed by *Trichostrongylus* species (22%) and *Oesophagostomum* species (3%).

## I. PUBLICATIONS

### Refereed publications

#### Refereed Conference Papers

Nimbkar, C., Chavan, K., Kumbhar, S. and Ghalsasi, P. 2022. Goat production system improvements in a drought-prone area in Maharashtra state of India boosted production of goats belonging to marginal farmers. Book of Abstracts (Ed. Kukovics, S. *et al.*) of the 13<sup>th</sup> International Conference on Goats held on-line on Sept. 19-22, 2022. P.159.

#### Non-refereed Conference Paper

Ghalsasi, P.M., Chavan, K.M., Satale, K.G. and Nimbkar, C. 2022. Factors influencing indigenous and exotic goat buck semen volume and concentration. Compendium of National Seminar cum Annual Conference on Prospects and Potential of Small Ruminant Production for Enhancing Income under Changing Scenarios, 10-12 November 2022 held at ICAR-CSWRI, Avikanagar, Rajasthan. SP-02-35. p. 95.

#### Marathi popular articles:

- 1) Nimbkar C. 2022 “NARI of Phaltan” (*Phaltanchi 'NARI'*) 21 October 2022. Article about the Nimbkar Agricultural Research Institute in the Diwali issue of the agricultural newspaper Agrowon. October-November 2023.

**Reports:**

- Nimbkar C. April 2023. Annual Report from 1 April 2022 to 31 March 2023 of the ‘Osmanabadi Goat Field Unit at NARI’ under the ICAR-All India Coordinated Research project (AICRP) on Goat Improvement. Submitted to the Project Coordinator, Central Institute for Research on Goats, Makhdoom, U.P. p. 53.

**II. INVITED TALKS/LECTURES conducted by NARI personnel during 2022-23 in virtual and physical mode**

<b>Date</b>	<b>Person who gave the lecture/visit</b>	<b>Organization arranging the lecture/visit</b>	<b>Topic of lecture/Seminar</b>	<b>Remarks</b>
24 to 30 April 2022	Dr. Chanda Nimbkar	Aga Khan Foundation, India	Visit to Project Mesha field areas	Visits to goat keeper flocks and monitoring of goat performance recording and other Project Mesha work. One-day training session on the ‘Principles and Practice of Community Goat Breeding Programs’ to Project Mesha staff members together with Dr. Shalini Kumar of AbacusBio.
3 August 2022	Dr. Chanda Nimbkar	Tata Trusts	Breeding strategy/approaches to improve performance of indigenous goat breeds	2.5 hour training session to 35 field officers working on various projects of the Tata Trusts, one of India’s oldest philanthropic organizations chaired by Mr. Ratan Tata. This was a part of a 3-day training program on ‘Sustainable livestock systems’ under the theme Rural Livelihoods.
23-24 August 2022	Dr. Chanda Nimbkar	Global Alliance for Sustainable Livestock, coordinated by the FAO, Rome	South Asia Regional Meeting	Dr. Chanda Nimbkar moderated (on-line) the session on ‘Livestock sector actions towards more sustainable food systems with reference

				to planetary boundaries’.
8 September 2022	Dr. Pradip Ghalsasi	Organized in association with Blue Cross Welfare Foundation, Sangli and Shekru. Foundation	Artificial insemination and genetic improvement in goats	Dr. Ghalsasi’s presentation was based on Artificial insemination being an effective tool, symptoms of oestrus and ways to recognize it, methods of thawing frozen semen, methods of artificial insemination in goats, benefits of artificial insemination, factors required to increase fertility after artificial insemination, Problems encountered at village level during artificial insemination and questions and answers series and resolved doubts.
15 October 2022	Dr. Pradip Ghalsasi	Sinhgad Institute of Pharmaceutical Sciences, Lonavala	Sustainable Approaches in Sheep Husbandry - NARI Suwarna	Dr. Ghalsasi’s presentation was based on NARI Suwarna sheep rearing.
20 January 2023	Mr. K. M. Chavan	Department of Social Forestry, Govt. of Maharashtra. Satara Section	NARI Nirbeeja Subabhul cultivation and benefits of feeding Subabhul leaves to goats	Two hundred fifty participants including Social Forestry department staff, Farmers and Students attended this webinar.

### III. MEETINGS ATTENDED

Date	Person who attended	Organization arranging the meeting	Title of meeting
22 June 2022	Dr. Chanda Nimbkar And Dr. Pradip Ghalsasi	State Nodal Officer AHSSOH cum Joint Commissioner AH Disease Investigation Section, Pune	World Bank Project- Animal Health System Support for Improved One Health –  Stake Holder Workshop
19 May 2022	Dr. Pradip Ghalsasi	Blue Cross Welfare Foundation, Sangli and Shekru. Foundation	Indigenous Livestock Series - Sheep - Deccani, Madgyal
23-24 January 2023	Dr. Chanda Nimbkar	Department of Animal Husbandry, Dairying and Fisheries, Government of India, BAIF Development Research Foundation	Workshop on Application of Genomics in Animal Breeding and Health

### IV. WEBINARS ATTENDED BY STAFF

(In Chronological order)

Sr. No	Date	Person who attended	Organized by	Subject
1.	12 July 2022	Dr. Pradip Ghalsasi and Ms. Karishma Shaikh	Food and Agriculture Organization of the United Nations.	Development of the Progressive Management Pathway for Biosecurity (PMP-B)
2.	1 to 5 August 2022	Mr. Kanhaiya Chavan	Maharashtra Animal & Fishery Sciences University, Nagpur and Post Graduate Institute of Veterinary and Animal Sciences, Akola	Training course on 'Modern Goat Farming Business'
3.	9 April 2022	Ms. Karishma Shaikh and Ms. Sanyogita Kumbhar	Sathya Zerograzing WhatsApp group with veterinary teaching faculty and scientists as members. Group formed by Dr. A. Valupadasu, Deputy Dir., Vety and AH	Basics of stall feeding in sheep and goats
	2 July 2022	Ms. Karishma Shaikh		Supplementary feeding strategies under Indian rearing system
	18 December 2022	Mr. Kanhaiya Chavan		Recent Advancements in Pregnancy

			Dept, Govt. of Telangana.	Diagnosis with special reference to sheep and goat
	29 January 2023			National Livestock Mission (NLM) Schemes
	5 February 2023			Ticks and Mites of sheep and goats - control and prevention
	12 February 2023			Haemonchosis in sheep & goats – A case study
	26 February 2023			Dystocia in sheep and goats & their Management
	5 March 2023			Gastrointestinal Parasitic diseases in sheep and goats – Management
	19 March 2023			Goat Breeds of India and their characteristics

#### V. Buyers of more than 50 frozen semen straws of bucks:

Sr. No.	Name	Number of straws supplied			
		Osmanabadi	Boer	Beetal	Damascus
1	Mann Deshi Foundation, Branches: Mhaswad, Vaduj, Lonand, Nashik, Satara, in Maharashtra state	3720	2826	-	60
2	Punyashlok Ahilyadevi Maharashtra Sheep & Goat Corporation, Ranjani farm, Kavathe Mahankal, Sangli, Maharashtra.	-	-	-	504
3	Jeevan Kisan Agro Association, Dhiraj Mankari, Indore, MP	-	1000	-	-
4	Deepak Shankar Dhumal, Maharashtra.	-	502	-	-
5	S.S.Bothekar, Phaltan, Dist- Satara, Maharashtra.	69	40	-	-
6	Vinayak Kare, Sakharwadi, Phaltan, Dist-Satara, Maharashtra	50	35	-	-
	<b>Total</b>	<b>3839</b>	<b>4403</b>	<b>-</b>	<b>564</b>

## VI. Dissemination of NARI Suwarna sheep for breeding

Sr. No.	Date	Name of the buyer	No. of animals supplied		
			Rams	Ewes	
			<i>FecB<sup>BB</sup></i>	<i>FecB<sup>BB</sup></i>	<i>FecB<sup>B+</sup></i>
1	07-04-2022	Uddarraju Anusha C/o Shrinivasa Karnataka	2	-	-
2	18-04-2022	Javarayi Gowda, Virupakshapura Kodigehalli Bengaluru-560097 Karnataka	1	4	1
3	22-04-2022	M.V Shadakshari Mugthihalli Post Chikmagalur Karnataka 577133	2	4	1
4	04-06-2022	Sriram Sahebrao Punde, A/P Kanurmesai, Tal Shirur Dist Pune	1	-	-
5	27-06-2022	Agricultural Development Trust Dairy, Sharadanagar Tal Baramati Dist Pune	1	-	-
6	23-07-2022	Mr Viju Varghese Lakolli village, Andalgi P. O Mundgod Taluk 581349	1	-	-
7	23-07-2022	Javeed Ahmad Chinnappa layout, Varthur, Bangalore 560087.	1	-	-
8	28-07-2022	Mr. K.Bhaskar Reddy Vinayaka Nagar Proddatur Kadapa (D.T) - 516360	1	3	2
9	16-08-2022	Mandava Raghavalya S/o Naga Bhushan Maddirala Muppalla Nagu luppala Padu Mandal Dist Praksham 52318	1	-	-
10	16-08-2022	Mandakini Research farm Pvt Ltd, Mahindra Hills East Maredpally, Secunderabad, Telangana.	-	1	1
11	16-08-2022	Divya Farm, (Britto) Yellagali Post, Uyambali Hobli, Kanakapura Taluk Ramanagara Jilha Bangalore.	10	2	2
12	16-08-2022	Tummala Krishnarjun Reddy & Tummala Ravindra Reddy Appareddypally Village Yadadri Bhuvanagiri Dist Telangana state	1	3	4
13	18-08-2022	Pramoda D S S/O Sidde Gowda, Daoddagarudanahalli Mandya Karnataka-571416.	1	-	-
14	25-08-2022	Karthik Kumar KM Krishnapura Ammanallur, Bangarapet Kolar, Karnataka	1	-	-
15	28-09-2022	Satish Surendra Hanagal, Hubli Dharwad R.M. Lohiya Nagar Gokul Road Municipal Corporation Hubli-30 Karnataka	3	-	-
16	06-10-2022	Ramkrushna Ekal, Bhigwan	-	1	2
17	30-10-2022	Kartik Menon, LVR Deshmukh H.No.13/65, Husnabad Village, Kodangal Mandal Vikarabad	1	2	2
18	31-10-2022	Capt.L.Panduranga Reddy, Shanti Soudha Apts. Erramanzil Colony, Hyderabad	1	2	3
19	3-11-2022	Dr.Muvva Rama Rao, Village Duggepally Mandal Thipraram Dist-Nalgonda, Telangana.	2	4	2

20	4-11-2022	Rakesh G.K., Chikatarahalli Village, Kikkeri Hobli, Mandya Dist Karnataka	1	-	-
21	7-11-2022	Nirvana Agro Farm C/o Mrs Vasanti Dhanraj Mangrole, Kulangna Budruk ,Tal Chikhaldara Dist-Amravati, Melghat Maharashtra	2	-	-
22	9-11-2022	Ravi Wader, S/o Basvantappa, Tal. Gokak, VCT Hadignal, Po Hadiginal Belgaum karnataka	-	2	1
23	9-11-2022	Siddappa Iduddi S/o Mutteppa VCT Hadiginal Belgaum Karnataka	1	3	1
24	23-11-2022	V.N.N. Prasad Villa No-30, Mystic Hills,green hills road Moosapet Hyderabad	1	-	-
25	22-12-2022	D K Srinivasulu Dno 6169 mattam Street Penukonda Anantipur Dist-Andhra Pradesh	1	-	-
26	17-01-2023	GN Laxmipathi Naikar S/O Nanappa Gollapalli Palyakere Chikkaballapur Karnataka	3	3	-
27	3-Mar-23	Gauri Tanaji Chavan, A/P:Kurvali, Tal-Indapur, Dist-Pune	1	1	1
28	11-Mar-23	Mr. Vinod Kumar Bondugula, S/O Bondugula Soma Shekar Reddy, 3-48, Ramchandrapur Mandal Bachnnapet, Ramchandrapur warangal, Ramachandrapuram, Telangana	2	3	3
29	11-Mar-23	Mr. Vongala Nagendrudu, C/o Vongala Sivarama Rangaiah, Govt.Degree College Road, Jammalamadugu, Cuddapah, Andhra Pradesh	2	3	2
30	20-Mar-23	Mr. Dhanaji Jotiram Patil, A/P: Khupire, Tal:Karvir, Dist:Kolhapur	1	-	-
		<b>Total</b>	<b>46</b>	<b>41</b>	<b>28</b>

#### VII. Visitors during the year to NARI-AHD

Sr. No.	Date	Visitor's name	Visitor's organization/Department	Purpose of visit
1	7 May 2022	Dr. Shalini Kumar	Abacus Bio, Denedin, NZ	Dr. Chanda Nimbkar, Mr. Navnath Patange and Ms. Karishma Shaikh gave her information about NARI AH Division, farm and Molecular Biology Laboratory.
2	5 March 2023	Smt. Leena Bavadekar, Manisha Kulkarni, Aruna Joshi, Mrudul Shirgurkar, Jyoti Joshi	Sharada Shakti (Western Maharashtra) Pune.	Dr. Chanda Nimbkar, Mr. K. M. Chavan, Mr. Dilip Bhandare gave them information about NARI AH Division, NARI Suwarna sheep breeding program at Lundy Farm Rajale, Wadjal Farm, Molecular Biology Laboratory, Parasitology Laboratory.

**VIII. Visits by groups during the year to learn about NARI-AHD's work.**

Sr. No.	Date	Particulars		Type of group	Organized by
		No of persons in group	Place		
1	2 May 2022	15	Pune	Goat Keepers of Velhe block	Chhaya Strategic Advisors, Pune
2	1 December 2022	36	Pune	Students of class VI, Aksharnandan School, Pune, headed by Mrs.	Aksharnandan School, Pune
3	14 December 2022	50	Badnapur	Students of 1 <sup>st</sup> year led by Mr. B.V. Patil, Associate Professor	College of Agriculture, Badnapur
4	17 December 2022	32	Pune	Sub-divisional Agriculture office, Mawal, Dist-Pune 410506	Goat Keepers and Farmers in Mawal area
5	20 December 2022	21	Pimpari	Rashtriya Prashikshan Prabodhini, Malshiras Branch, Dist- Solapur	Goat Keepers of Pimpari block
6	11 January 2023	40	Chiplun	Sub-Divisional Agriculture office, Chiplun, Dist-Ratnagiri	Farmers
7	10 March 2023	25	Pune	Medical students	Shri. Kashibai Nawale Medical College & General Hospital Narhe, Dist-Pune

Women trainees of Self-Help Group of Manndeshi Foundation, Satara, Dist. Satara, Maharashtra

Sr. No.	Date	No of persons in group	Name of Branch
1	19 May 2022	11	Vaduj
2	23 June 2022	25	
3	16 July 2022	20	
4	10 August 2022	28	
5	24 September 2022	21	
6	1 October 2022	22	
7	6 October 2022	30	
8	11 October 2022	28	
9	21 October 2022	19	
10	19 November 2022	42	
11	13 December 2022	16	
12	28 December 2022	40	
13	25 January 2023	30	
14	4 March 2023	25	
15	29 July 2022	14	Dahiwadi

16	24 September 2022	60	
17	30 September 2022	10	
18	14 October 2022	11	
19	24 December 2022	25	
20	11 March 2023	35	
21	17 September 2022	40	Mhaswad
22	17 February 2023	20	
23	18 February 2023	27	
24	8 March 2023	22	
25	24 August 2022	14	Jejuri
26	7 September 2022	32	Satara
27	25 November 2022	30	
28	7 December 2022	10	
29	14 March 2023	65	
30	7 February 2023	20	Lonand
31	15 February 2023	20	
32	21 February 2023	27	
33	3 March 2023	30	

- On 28-29 September 2022, 30 farmers and goat and sheep owners from The Timbaktu Collective in Andhra Pradesh travelled by bus for 24 hours to come to NARI for a 2-day training and exposure visit to learn about goat and sheep management, AI and genetic improvement. They were impressed with the systematic recording practices implemented in the Osmanabadi Field Unit. We organized their visits to Lundy farm, Rajale to the NARI Suwarna nucleus flocks and showed them different types of fodder plots and sheep grazing areas. We also gave them demonstrations of the use of a sheep race for weighing, vaccination etc. We also organized their visit to Dhakale village to show them the working of the ICAR-AICRP Osmanabadi Goat Improvement Project.



Visit of trainees from Timbaktu Collective to NARI AHD and Lundy farm, Rajale.