vf[ky Hkkjrh; cdjh lq/kkj

leUo; vuqla/kku ifj;kstuk

All India Coordinated Research
Project on Goat Improvement

Project Coordinator's Report
(2013-2014)

S. K. Singh

M. S. Dige

dsUnzh; cdjh vuqla/kku laLFkku] e[knwEk Qjg] EkFkqjk m0iz0

CENTRAL INSTITUE FOR RESEARCH ON GOATS

MAKHDOOM, P.O.FARAH – 281122, MATHURA (U.P.)

CONTENTS

A)   Salient Achievements

All India Coordinated Research Project (AICRP) on Goat Improvement is a major long term programme focused to bring upon genetic improvement under prevailing ecosystems, to conserve goat genetic resources in their area of evolution and adaptation. The project explores genetic variations in local breeds through structured and systematic pedigree and performance recording of goats in the farmers flock. Presently, thirteen breeds are covered through eighteen centres across the country, which are coordinated through a Coordinating Unit located at CIRG, Makhdoom, Mathura. Three breeds i.e. Barbari, Jamunapari and Sirohi are being maintained under semi-intensive farming system with optimum feeding to explore genetic potential of the breed in given environment. Then other breeds viz. Assam Hill goat at Guwahati, Black Bengal at Kolkata and Ranchi, Gaddi at Palampur(HP), Marwari at Bikaner,Osmanabadi at Phaltan(Satara district of Maharashtra), Sangamneri at Rahuri, Sirohi at Vallabhnagar (Udaipur), Ganjam at Bhuvaneshwar, Surti at Navsari and Malabari at Thrissurare being improved under farmer's flock in their respective home tract. The major thrust of the project is to build up long term capacity of goat keepers through technology demonstration, capacity building, application of health management practices andintroduction of genetically superior breeder goats for enhancing their production and reproduction potential.

ABSTRACT
Assam Hill Goat Guwahati

The Assam Hill Goat Field unit was implemented in the year 2009-10, under the XI five year plan. As per the technical programme four field units, viz., a) Batabari, Mongoldoi, b) Tetelia Gandhinagar, Kamrup (M) c) Nahira, Kamrup (R) and d) Tepesia, Kamrup (M) has been established. The numbers of registered animals in the corresponding field units were 515, 455, 244 and 334, respectively with 1548 as opening and 1667 as the closing balance for the year 2013-14 belonging to 209 farmers. With the intervention of the AICRP the attitude and knowledge level of farmers have enhanced significantly. Number of kids born during the period was 928, out of the total 751 initial adult does indicating an overall population growth of 106.26 %.The overall percentage of single born kids was 51.69 % followed by twining 39.86% and triplet 8.45% in the four field units .Tetelia recorded the highest birth (325) followed by Batabari (256). The kidding frequency was recorded as 154.72, 148.15, 177.78, 140.00, 164.86, 166.30, 155.56, 166.67, 149.06, 145.57, 156.67 and 154.41 % from the month of April 2013 to March 2014 respectively. The average kidding frequency for this period was 156.76%. The average age and weight at first service and first kidding in all the four units were recorded as 257.95±7.07days, 9.93±0.23 kg and 412.98±15.44 days and 13.92±0.29 kg respectively. The service period, kidding interval and gestation period for the field units were observed to be 87.41±5.32, 234.61±4.89 and 147.51±0.59 days respectively.The animals of the breed are smaller in size. The average body weight of goats for male and female were 1.28 and 1.13 kg, 5.22 and 4.99 kg, 7.90 and 7.51 kg, 10.56 and 9.86 kg and 13.51 and 12.86 kg of age at birth, 3 months,6 months, 9 months and 12 months of age, respectively.As expected the overall birth weight of kids recorded to be the highest in both the sexes at all the ages for all the single born kids while it was the lowest for triplet born kids. The average body length, body height and heart girth were 59.10±1.41, 45.32±1.08 and 49.01±1.32 cm respectively. The measurements were found to be higher in male than the females. The overall morbidity was recorded to be 23.74% in all the four field units and the highest morbidity was recorded in Nahira (31.15%), followed by Batabari (24.51%). Dermatitis/Itching caused by mange infestation was found to be one of the major causes of morbidity (27.04%) affecting mostly the adult animals. It was followed by Abcess/Wound/Injury (11.90%), Diarrhoea/Enteritis (11.05%) and Pneumonia (8.33%).The average mortality rate was restricted to 6.70% as compared to 9.75% in the previous year. The highest Mortality was recorded in Tepesia field unit (8.51%) while it was found to be the lowest at Batabari field unit (5.71%). The cause of mortality was not only diseases but also due to

frequent attack by the predators like fox, dog and leopards etc. Pneumonia (23.49%) has been found to be the major cause of mortality in all the field units. Apart from Pneumonia, Colibacillosis (17.47%) and Predation (18.07%) are also found to be major causes of mortality in the animals. Among the age groups, the highest mortality was recorded in the age group of 0-3 months (13.10 %) followed by 3 – 6 months (8.77%), 6 – 12 months (3.96%) and Adult (1.8%).Overall 20.44% of the registered Goats were sold by the beneficiaries under the project in four field units. Out of 954 males, 296 (31.03%) and out of 1522 females, 210 (13.80%) were sold, including 33 males sold for breeding purpose. The total numbers of animals disposed was recorded to be 137 out of which 80 animals were for health and 57 numbers were for production ground.

Barbari Unit Makhdoom

At Barbari Farm Unit, Makhdoom on 1st April, 2014, 602 Barbari goats were available (394 does and 48 bucks). One hundred eighteen and one hundred three superior does and bucks were distributed for grading up, conservation and genetic improvement of farmers flock. In all 327 kids born at the farm during the year. The population growth during the year was 147%. The overall least squares mean for body weight at birth, 3, 6, 9 and 12 months of ages during the year were 1.77±0.01, 7.63±0.06, 11.21±0.10, 15.71±0.17 and 19.16±0.20 kg respectively. Single born kids were significantly heavier than that of twin or triple up to 12 M of age. The least squares means for 90 and 140 days part milk yield, lactation milk yield and lactation length for the year 2013-14 were highest over the previous year i.e. 58.10, 81.78, 69.67 liters and 132 days respectively. Kidding rate was 1.60.

Black Bengal Unit Kolkata

A new village Bamunia with 119 does in Bhawangola-I Block of Murshidabad district was adopted in February 2014. Thus the unit is now working in three clusters i.e. Ayeshpur and Ganguria (Nadia district), Rangabelia (South 24 Parganas district), Bamunia (Murshidabad district). The average flock strength of the farmers was 4.50 during 2013-14 whereas the initial flock strength was 2.53 in 2002-2003. Total 522 does and their 956 kids were recorded during 2013-14. They were protected with vaccination as per schedule and deworming and spraying as required. About 83 % of the does kidded once and 17 % of the does kidded twice during this year. The average litter size from 521 kiddings in the three villages was 1.83. The overall mortality was 6.80% during 2013-14. Nineteen selected superior breeding bucks were placed in the villages for breeding of does. Twelve Black Bengal bucks have been distributed in the clusters in addition to previous bucks. Further some young male kids are also growing up at buck raising centres under the project. Self-Help Groups of women are operating smoothly with regular meetings and micro-finance benefits to all members. Seven deworming cum mineral mixture distribution camp, 10 treatments cum vaccination camp (against PPR, Goat Pox and Enterotoxaemia), 10 awareness cum interactive sessions in evening hour sessions also conducted in villages to reduce their misconceptions and improve knowledge. Beside this treatment of all goats under the project is also under operation. A considerable number of bucks and does have also been sold to the NGO and Community goat keepers. The average income per farmer per year is Rs 4243/- and per doe per year is 1763/- during 2013-14.

Black Bengal Unit Ranchi

As per technical programme, fourcenters of AICRP have been established in different zones of Jharkhand. Base line data on Black Bengal goats and farmers have been completed. Data on growth and reproduction parameters have been recorded and analyzed. A total of 29 buck (on the basis if growth and multiple birth) were selected from three different centers and distributed among the farmers for breeding and improvement purposes. The selected bucks have been exchanged from one centre to others to avoid inbreeding. Selection differential of male at 9 month of age were estimated to be 3.39 kg. The overall means of body weights at birth, 3, 6, 9 and 12th month of age

were 1.20±0.04, 5.36±0.06, 8.22±0.07, 10.33±0.07 and 12.23±0.09 kg, respectively. The overall reproductive parameters of Black Bengal goats viz. age at first mating, body weight at first mating, age at first kidding, weight at first kidding, service period, kidding interval and gestation period were 270.43 ± 1.84 days, 10.48 ± 0.64 kg, 420.92 ± 1.19 days, 11.58 ± 0.35 kg, 68.21 ± 2.06 days, 217.72 ±2.41 days and 146.27 ± 0.81 days , respectively. Kidding rate in Black Bengal goats was 1.57. Pro-poor goat based technology has been developed by the Ranchi Veterinary College, BAU and are being used by the farmers extensively such as dipping with Malathion 0.25% and castration of kids at the age of 2 months. All the goats in coverage areas were vaccinated with PPR (1822 goats), dipping (1261 goats) and deworming of 2924 goats has been done. Training on 'Scientific Goat Rearing' was organized in which 30 farmers from different centres were participated. Five selected farmers from different centres were attended 'Farmer's Innovator Day' at CIRG, Mathura.

Gaddi Unit

Four field units comprising of 1149 goats including 749 breedable does belonging to four different migratory routes were monitored. All the animals were identified by ear tagging. A total of 625 young kids were added in selected flocks by way of birth, 118 animals of different age groups died and 459 animals pertaining to different age groups were sold by the owners. The closing balance as on 31.03.2014 was 1197 animals under different age groups. A total of 25 male kids of 4-6 months age group were purchased from these units after primary selection on the basis of morphological characteristics and better/ higher growth rates. These male kids were then transferred to Palampurcentre for subsequent rearing up to the age of sexual maturity, following all standard management practices. *After final selection, a total of 17 bucks were finally distributed to 15 different farmers as a breeding input.* All selected animals were provided health coverage under migratory field conditions viz. vaccination against PPR (200 doses), de-worming (900 animals) against endo-parasites after faecal sample analysis, periodic health checkups etc. Strategic supplementary feeding was also provided in the form of mineral mixture (344 Kg) and concentrate feed (49 qtls.) supply. Collaboration with state Animal Husbandry Department was ensured while providing health coverage and other related activities. The overall population growth was observed to be 106.14%. The overall mortality incidence was found to be 6.65%. The incidence of twin birth was recorded 19.96%. The overall abortion incidence in the flocks was observed to be 6.71%. The kidding rates of the flocks were observed to be 1.25%. Maximum kidding was recorded in the month of November (176 kids) and December(156 kids).

Ganjam Field Unit

The project is operational at the native tract of Ganjam breed of goat in three centers Chhatrapur, Rambha and Khallikote with a total of 51 registered farmer's. The objective of the project is improvement of production performance of Ganjam goats in its native tract in the farmers' flocks. The project is operating as per the technical programme. Baseline information on distribution, prevailing management practices, production, reproduction and socio-economic profile of the farmers have been collected, analyzed and reported to P.C. unit from time to time. Status report on Ganjam goat has been prepared with the technical guidance of Director, CIRG, Makhdoom. The improvement in body weights at 9 month age and one year age has been 2.6 kg and 5.9 kg respectively. Kid mortality is controlled around five to six percent over the years though this year there is a spike in the mortality due to Phaillin. A total of 4300 animals were vaccinated against PPR and Enterotoxaemia, 10112 deworming dosages were administered and 2312 number of goats were treated and so were 197 other animals this year. The health coverage programme is routinely carried out. An experiment on the parasitic load of the free ranging goats of the registered farmers was carried out to investigate the effect of suitable anthelmetic for deworming. One semen evaluation cum storage laboratory has been constructed. A total of 15 superior young bucks have been selected and brought over to the Instructional Livestock Farm, CVSc&AH, OUAT, Bhubaneswar which are reared there for distribution next year. This year three breeding bucks were distributed to

the newly registered farmer who were having no bucks. One workshop cum Farmer sensitization programme was organized at Rambha under the aegis of NICRA and CIRG where 100 goat farmers of Chhatrapur, Rambha and Khallikote attended. The farmers were advised about the care of animals during the adverse kind of weather condition.

Jamunapari Unit Makhdoom

The population growth of Jamunapari goat was 125.4% and highest kidding was observed during the year. The kidding rate was 1.46 and the unit supplied 213 improved animals for breed improvement programme in field condition. The mean of body weights of kids at birth, 3, 6, 9 and 12 months of age over the year were 3.41kg, 12.11kg, 15.10kg, 19.50kg and 26.48kg, respectively.Least squares means of part lactation milk yield in 90 days and 140 days were 95.28 and 111.16 liters, respectively during the year. The kidding rate was 1.46. During this year, a total of 254does kidded 373 kids , out of which single ,twin and triplet born kids were 138,226 and 9 respectively.Estimates of variance and co-variance components were obtained using the ASREML program. Milk production data of 2217 Jamunapari goat during the period 1995 to 2012 was analysed. The mean 90 days, 140 days and lactation milk yield of the Jamunapari goat over the 17 years was 80.18 litre, 113.98 and 124.82 litre, respectively. The average lactation yield was 124.82 litrewith a lactation length of 179.5 days.Genetic trends were estimated for each trait by regression of EBV averages on year of birth, weighted by the number of animals in each year. A positive genetic trend was obtained for milk yield in Jamunapari goat population and showing significant improvement over the years in milk yield during 90 and 140 days.

Malabari Unit

The population growth recorded was 70.92%. The body weight gain ranged from 53.17g to 61.94g per day, highest observed in one to third months and lowest between nine and twelve months age. Average litter size was 1.68 and percentage of singles, twins and triplets were 40.15, 52.52, 6.95 and 0.40 respectively.The mean of age at first kidding and inter kidding interval were 398.10±12.50 and 276.80±13.80 days respectively. Majority of goat keepers (93.10%) in the project area had school education with land holding of below 25 cents. Average flock size was 3.60 adult female goats. Participation of women in the project is 63.66%.Enteritis is the major cause of morbidity followed by Pneumonia. Mortality reduced from 7.70% to 7.20% in the project area.The main source of income is from sale of kids followed by milk and the annual return is Rs. 7651/year/ goat. As capacity building, 530 farmers and 128 vocational students has been trained in goat rearing in collaboration with Agriculture/Animal Husbandry/Rural Development Departments and Milk co-operative unions in 25 trainings.

Marwari Field Unit, Bikaner

Marwari field unit is located at hot and arid zone of Rajasthan, Bikaner (RAJUVAS). Four clusters were established in Bikaner districts i.e. in Deshnok, Kalyansar, Raisar and Daiya. The new cluster in Kan Singh JiKi Sid with about 500 goats does in the Jodhapur district approximately 100 km away from the head quarter was adopted during this financial year. One more cluster approximately 150 km away from the head quarter will be started very soon in the near future. In addition to these clusters, the Buck rearing Center is also functioning at Livestock Research Center, Kodemdeshar for rearing of elite bucks for distribution to the farmers in the field unit area. Thus the unit is now working in five clusters from distant corners of breeding tract so as to explore maximum genetic variation available in the breeding tract. All the registered goats in new cluster of *Kan Singh jiKi Sid*were identified by brass tag and distributed superior Marwari bucks for breeding purpose. Total 215 adult does and their 75 kids were tagged. The average family size was 27.8 in this new cluster. Sixteen selected superior breeding bucks were placed in the selected cluster for breeding of does in the village. Total 1296 adult does and their 1396 kids were recorded during 2013-14. The overall least square mean for body weights at birth, 3, 6, 9 and 12 months of age were 2.57, 7.96,

14.91, 19.07 and 25.42 Kg, respectively. The birth weight was significantly influenced by cluster, sex of calf, single/twin kid and kidding month. Milk yields were recorded more than 200 does about fortnightly during the lactation. The kidding take place round the year but it was more from the month of October onwards and it occurs in the open. No special care to the dam or neonatal kid in the form of concentrate feeding is practiced. The overall kidding per cent was 91.50 %, incidence of abortions and stillbirths were 0.33 % and twinning percent was 7.71 %. This may be due to adaptation of scientific managemental practice by the goat breeder and proper care of animals during the prevalent famine conditions. A total of 27599 animals of the flock were provided health coverage by way of vaccination against PPR, ET, dipping and de-worming besides strategic supplementary feeding in the form of mineral mixture.

Osmanabadi Field Unit

A new centre of the Osmanabadi Field Unit was started in July 2013 in Borla village (with about 130 goats) in Jamkhedtaluka of Ahmednagar district, thus making the total number of centres four; Wadgaon in Satara district, Kamone in Solapur district and Sakat and Borla in Ahmednagar district. Total 723 adult does and their 1505 kids were recorded during 2013-14. There were 116, 297 and 310 adult female goats in Satara, Solapur and Ahmednagar districts, respectivelybelonging to 232 goat keepers. The average number of goats per household was thus 3.12. All goats and kids were protected with vaccination as per schedule and deworming and spraying as required. Milk yields of 400 does were recorded about 4 times during the lactation.About 90% of the does older than one year, kidded during the year and 15-20% of the does kidded twice in the year. The average litter size from 874 kiddings during the year in the four villages was 1.72. fifty one percent of the kidded does had twins, 39% had singles and 10% had triplets or quadruplets. The overall average litter size over five years was 1.68 from 5,662 kids born in 3,372 kiddings. The overall least squares mean weight was 2.4±0.07 kg at birth, 10.5±0.2 kg at 3 months, 15.7±0.6 kg at 6 months, and 22.7±1.9 kg at 9 months. The 100-day milk yield of does that had given birth to single, twin, triplet and quadruplet kids was 63.6±2.1 kg, 94.4±1.8 kg, 126.8±3.8 kg and 144.7±14.9. The average age at first kidding was 413+90 days (about 13.5 to 14 months) with a range of 249 to 703 days. This means that the average age at first ovulatory oestrus is 8.5 to 9 months.

Sirohi Unit Avikanagar

The opening balance on 1.4.2013 was 196 males and 457 females total 680 animals. The additions during the year were due to birth of 135 male and 116 female kids. The reductions were due to deaths of 23 males and 16 females, culling of 10 males and 38 females, sale of 66 males and 92 females. The closing balance as on 31.3.2014 was 211 males and 446 females totaling 657 in all. The overall least squares means for live weights at birth, 3, 6, 9 and 12 months of age were 3.06, 11.78, 18.79, 23.90 and 28.24 kg, respectively. Males were heavier than the females at all stages of growth. The effect of year, sex and type of birth was significant on almost all the traits. The growth rate in terms of per day average gain was 96.84 and 59.48gm from 0 to 3 months and 3 to 12 months of age, respectively. The overall least squares means for milk yield at 90 days, 150 days, total lactation milk yield and lactation length were 74.37, 98.76 and 104.34 kg, and 178.01 days, respectively. The effect of year of kidding was significant on all the traits, where as type of birth was significant on TLMY only, and lactation order was significant on 90DMY and LL only. Out of 336 does available for breeding during report period 297 were tupped and 223 kidded with 26 giving birth to twins and one triplet during the year. The tupping percentage was 88.39. The breeding efficiency was 69.00 and 78.28%, on the basis of does available and tupped, respectively. The kidding percentage was 76.29 and 86.55 on the basis of does available and tupped, respectively. The litter size was 1:1.13. The mortality rates in 0-3, 3-6, 6-12 month age group and in adults were 1.77, 1.04, 6.53 and 2.07 percent, respectively. The overall mortality rate irrespective of age groups was 2.38 percent. A total of 158 animals comprising of 66 males and 92 females were supplied to the progressive farmers, Government and non-government agencies for improvement of their livestock

for meat and milk during 2013-14. The total receipts from sale, transfer, culling etc. of live animals and milk during the year were Rs 10,97,459.00.

Sirohi Unit Vallabhnagar

On-going AICRP on goat improvement (Sirohi field unit) came in to financial existence on 1st January 2001, with the main objective to bring about the improvement in the farmers flock. As per technical programme base line information on production and reproduction traits, managemental practices, production trend and disease pattern were recorded and analyzed. The registration of farmer's flock and identification of animals were carried out in four clusters. The data on growth, lactation and reproductive performance of Sirohi goats under field conditions have been analyzed using least square techniques since 2007. The closing balance of the registered flock was 1220 animals including 980 females. During report period, 496 kids were born out of which 234 were males and population growth was 81.75% recorded. Total 292 males were sold out of which maximum 96 males were sold between 6-12 months of age.Since inception of the project 713, 1240, 732, 965, 2426 and 271 kids were born in 1st, 2nd, 3rd , 4th , 5th and 6th sets of bucks respectively. The least square means for body weight at birth, 3, 6, 9 and 12 months of ages were 2.46±0.03, 13.72±0.19, 18.00±0.29, 21.83±0.53 and 26.32±0.51 kg, respectively. The body weights increased over the years. Heritability of birth weight was found to be moderate. Year, season of birth, sex of kid and type of birth have significantly affected the body weights. Kids born between months July-October had higher weights at birth and 9 months body weight whereas kid born between March to June had higher body weight at 3,6 and 12 months of age. Single born kids were significantly heavier than the multiple born kids at all the ages.The overall least square means for milk yield over 90 days, 150 days, lactation yield and lactation length were 72.08±2.79, 104.29±3.49, 104.60±3.45 lit. and 151.11±0.37 days, respectively. The lactation length was shorter than previous years. Season of kidding had significant effect on milk yield. The lactation order played a significant role in milk yield.Age at first mating, weight at first mating, age at first kidding, weight at first kidding, service period, kidding interval and gestation period of test progenies were 537.10±9.14 days, 27.44±0.10 kg, 686.31±9.13 days, 30.15±0.09 kg, 227.42±3.78, 376.90±3.76 and 150.03±0.07 days, respectively. The age at first mating and first kidding has lower than previous year. The kidding rate (litter size) was 1.30.During report period 2145 animals were dewormed,ecto-parasiticide was used in 2840 animals. Further, 1250 and 600 animals were vaccinated for ET & PPR, respectively. The overall mortality was 1.97%.

SurtiGoat Unit

The data on growth, lactation and reproductive performance of Surti goats under field conditions have been analyzed using least square techniques for the year 2013-14. The closing balance of the registered flock was 886 animals including 707 females. During the year, 520kids were born out of which 266 were males. White coloured kids born during the year were 131 males and 130 females respectively. Major constraint faced during the year again remained non availability good quality white coloured Surti bucks. Closing balance for male Surti bucks remained only 12 due to sale of white coloured Surti bucks during Id-ul-Fitar festival as preferred by Muslims of South Gujarat region. Total 192 males were sold out of which maximum 77 males were sold between 6-12 months age. Overall population growth of 95.67% was recorded with the addition of 520 live kids. The least square means for body weight at birth, 3, 6, 9 and 12 months of ages was 2.008 ± 0.026 (520), 9.984 ± 0.113 (302), 17.287 ± 0.165 (248), 20.073 ± 0.185 (200) and 23.276 ± 0.504 (99) kg, respectively. Season of birth, sex of kid, breed, type of birth and clusters had significantly affected the body weights. Kids born between November and February months (winter) had higher birth weights at birth, 3, 6 and 9 months. Kids born during summer had shown highest body weight at 12 month of age. Single born kids were significantly heavier than the multiple born kids during first nine months, whereas differences get subsides as they approach 12 months of age. The overall least square means for milk yield over 90 days, 150 days, lactational yield and lactational length was

120.22 ± 1.27 (171), 169.99 ± 2.19 (128), 178.14± 2.97 (128) liters and 165.81± 1.80 (171) days, respectively. Age at first mating, weight at first mating, age at first kidding, weight at first kidding, service period, kidding interval and gestation period was 506.41 ± 29.65 (44) days, 21.45 ± 0.48 (44) Kg, 651.36 ± 29.79 (44) days, 22.95 ± 0.48 (44) Kg, 197.17 ± 4.47 (307), 347.21 ± 4.70 (307) and   150.04± 0.33 (307) days, respectively. The kidding rate (litter size) was 1.48 justifying higher prolificacy in Surti Goats. During current year 2165 animals were dewormed, Mineral mixture and antibiotics were distributed for use in 1510 animals. Overall mortality in Surti flocks was 7.33%. Total 21 bucks were available in adopted villages during breeding season on rotational basis and 11 bucks were provided to government organization, NGO and newly adopted villages to minimize the problem of non availability of Surti bucks.

Sangemneri Unit Rahuri

The AICRP on Sangamneri goat (field based units) is executed from 21.3.2002 with the main objective of bringing the genetic improvement in growth, reproduction and production performance in the farmers flock of Sangamneri goat. Accordingly, the baseline information pertaining to growth, reproduction, production and management practices followed by farmers was collected. The programme was initiated by registering 500 does located in the breeding tract. However, as per the directives given during scientist meet the programme is extended by registering 1268 breedable does. The area under execution is divided in four centres (clusters) as Sangamner, Shrirampur, Rahuri and Belha covering three districts i.e. Ahmednagar, Nasik and Pune. Total 43 breeding bucks were rotated in the field during 2013-14 and total 1875births were obtained in the field. The overall least squares means for 1,3,6,9 and 12 months body weight were 4.96±0.05(7974), 9.12±0.09(7024), 13.71±0.21(2569), 18.23±0.26(1638) and 22.31±0.34 (1086) kg, respectively.All the non genetic factors viz. village cluster, year of birth, season of birth, type of birth and sex exerted significant (P<0.01) influence on body weights at all the ages except the season of birth had non significant influence on body weight at 9 and 12 month and type of birth on 12 month of age. While body weight of all the ages were significantly (P<0.01) influenced by sire.The age at maturity, age at first conception and age at first kidding were 251.05±3.70(371), 318.53±13.41(634) and 469.53± 13.57(620)days, respectively. While the service period and kidding interval were 118.27±9.20 (754) and 266.36±9.45 (703) days, respectively. The numbers of kids per kidding were 1.84±0.07 (1287). The non-genetic factors i.e. village clusters and year and season of birth had significant influence on pre-partum traits except year of birth had non-significant influence on age at maturity. Type of birth had non-significant influence on all the pre-partum reproductive traits under study. While the post-partum reproductive traits viz. village cluster and season of kidding had exerted significant influence on post-partum traits except no. of kids per kidding. No. of kids per kidding significantly influenced by year and season of kidding.

Project CoordinatingUnit

The Project Coordinating (PC) Unit of AICRP on Goat Improvement is located at CIRG, Makhdoom, Farah, Mathura. Presently 18 unitsare conducting research for improvement of goats in AICRP on Goat Improvement.

Table: Coordinating Units of AICRP on Goat Improvement

SNo	Breed	Location of Centre	Type of Centre
1.	Project Coordinators Unit	CIRG, Makhdoom, Farah, Mathura	Coordinating Unit
2.	Andamani Goats (Partially TSP)	CARI, Port Blair	Field
3.	Assam Hill Goat Unit (NEH)	AAU, Veterinary College Campus Burnihat, Guwahati	Field
4.	Barbari Unit	CIRG, Makhdoom, Mathura UP	Farm
5.	Bengal Goats (TSP)	BAU Ranchi Jharkhand	Field
6.	Black Bengal (Partially TSP)	WBUV AFS, Kolkata	Field
7.	Changthangi Goat Unit (TSP)	SKUAST-K Leh Campus J&K	Field
8.	Gaddi Field Unit (Partially TSP)	HPKVV, Palampur (HP)	Field
9.	Ganjam Field Unit	OUAT, Bhubaneswar, Odisha	Field
10.	Himalayan Local Goats	IVRI Campus, Mukteshwar, Uttarakhand	Field
11.	Jamunapari Farm Unit	CIRG, Makhdoom, Mathura UP	Farm
12.	Malabari Field Unit	KV&ASU, Thrissur, Kerela	Field
13.	Marwari Field Unit	RAJUVAS, Bikaner, Rajasthan	Field
14.	Osmanabadi Unit	NARI, Phaltan (MH)	Field
15.	Sangamneri Field Unit	MPKV, Rahuri (MH)	Field
16.	Sirohi Farm Unit	CSWRI, Avikanagar, Rajasthan	Farm
17.	Sirohi Field Unit (partial TSP)	RAJUVAS, Veterinary College, Vallabhnagar (Raj.)	Field
18.	Surti Field Unit (TSP)	N.A.U., Navsari (Guj.)	Field
19.	Uttarakhand Local Goats	GBPUA&T, Pantnagar, Uttarakhand	Field

Monitoring of Units

The unit were visited by the Director CIRG and I/C PC Unit to evaluate the progress of research work.

S.No. **Tour /Visit Dr. S.K. Singh, I/C AICRP on Goat Improvement April, 2013 to March 2014**

1. Visited Osmanabadi Field Unit, Faltan with Dr. KML Pathak, the DDG, ICAR from 24.04.2013 to 26.04.2013.
2. Visited Sangamneri Field MPKV, Rahuri from 26.04.2013 to 29.04.2013.
3. Participated in the meeting of XII Plan on dated 4-6 July, 2013 at ICAR New Delhi.
4. Visited New Delhi on 4-5, June 2013 for XII Plan discussion with DDG(AS) and Dr. ChandaNimbkar of NARI, Faltan.
5. Conducted tour for Project Formulation with ILRI and Survey the area adopted by ILRI in Uttarakhand from 30-6-2013 to 5-7-2013.
6. ICAR, New Delhi 6-7-2013 to attend XII plan proposal meeting
7. Attended Project Formulation Meeting of DAHD on small ruminant from 14.07.2013-15.07.2013 at ICAR New Delhi.
8. Attended the meeting to discuss the Key Policy issues related to small ruminant sector in the country organized by ILRI at Park Hotel, Connaught Place, New Delhi on 13th August, 2013.
9. Conducted Annual Review Meet of AICRP on Goat MPKV Rahuri 4-9 Sept, 2013.
10. Attended the meeting to discuss Budget of AICRP to with DDG (AS) ICAR New Delhi on 28 Sept to Oct 02.
11. Went to GKVK, Banglore, for delivering lead article in annual KVK meet, from 22-25 Oct. 2013.
12. Visited AICRP Malabari Unit Trichur from 27-10-2013 to 30-10-2013.
13. To visit AICRP on Goat Improvement Sirohi Unit Avikanagar(Raj) and attend advisory committee meeting on goat improvement between 11.11.2013 to 12.11.2013.
14. Attended World Bank funded RACP mega project advisory committee meeting on goat improvement between13.11.2013 to 14.11.2013.
15. Attended XII Plan EFC meeting New Delhi on 11-12-2013.
16. Participated ANGR Country Report meeting held at Karnal on from 20-12-2013 to 22-12-2013.
17. Attended XII Plan EFC meeting New Delhi on 11-12-2013 to12-12-2013.
18. Attended Workshop/seminar on Conservation of animals ICAR, New Delhi from 09.01.2014 to 11.01.2014.
19. Attended Director's Conference held at Pune and visit to AICRP Units Baramati, Udaipur from 18-01-2014 to 21-01-2014.
20. Visited AICRP on Goat Improvement Sirohi Field at Udaipur from 22-01-2014 to 24-01-2014.

Budget Allocation and Fund Provisions

For the financial year 2013-14, a total of Rs 290 lakhs was allocated under RE by ICAR New Delhi.

Table PC 3: Budget allocation for the year 2013-14 under AICRP on Goat Improvement

S.No. General	Name of the Centre Total of Unit	Type	Capital Assets	Salaries	General (OT NEH)	General (NEH)	General (TSP)	General
1.	P.C. Cell, CIRG. Makhdoom	O.T. NEH	0.00	0.00	5.03	0.00	0.00	5.03
2.	Jamunapari Unit, CIRG, Makhdoom	-do-	0.00	0.00	6.22	0.00	0.00	6.22
3.	Barbari Unit, CIRG, Makhdoom	-do-	0.00	0.00	6.25	0.00	0.00	6.25
4.	Sirohi Unit, CSWRI, Avikanagar	-do-	0.00	0.00	11.8	0.00	0.00	11.8
5.	Marwari Field Unit, RAJUVAS, Bikaner	-do-	0.00	21.00	24.54	0.00	0.00	24.54
6.	Black Bengal Field Unit, WBUA&FS, Kolkata	-do-	0.00	21.00	9.00	0.00	0.00	25.0
7.	Ganjam Field Unit, OUA&T, Bhuvaneshwar	-do-	0.00	21.00	9.00	0.00	0.00	25.0
8.	Sangamneri Field Unit, MPKV, Rahuri	-do-	0.00	21.00	9.00	0.00	0.00	35.5
9.	Malabari Field Unit, KVA&SU, Trichur	-do-	0.00	21.00	6.00	0.00	0.00	25.0
10.	Sirohi Field Unit, RAJUVAS, Udaipur	-do-	0.00	21.00	9.00	0.00	0.00	26.1
11.	Osmanabadi Field Unit, NARI, Phaltan	-do-	0.00	11.00	14.00	0.00	0.00	21.86
12.	Gaddi Field Unit, HPKV, Palampur	-do-	0.00	10.00	15.00	0.00	0.00	21.0
13.	Surti Field Unit, NAU, Navsari	TSP	0.00	10.00	11.00	0.00	5.00	18.1
14.	Black Bengal Field Unit, BAU, Ranchi	TSP	0.00	10.00	11.00	0.00	5.00	16.1
15.	Assam Hill Field Unit, AAU, Guwahati	NEH	0.00	9.00	0.00	20.00	0.00	22.5
	Total		**0.00**	**176.00**	**144.00**	**20.00**	**10.00**	**290.0**

Table PC 4: Head-wise Budget allocation Actual and Expenditure from 2012-14

Head	2012-13 (Actual)	2013-14(B.E.)	2014-15(B.E)
A. CAPITAL			
1. Works	**0.00**	**5.00**	**11.50**
A. Land	0.00	0.00	0.00
B. Building			
(i) Office Building	0.00	0.00	0.00
(ii) Residential building	0.00	0.00	0.00
(iii) Minor works	0.00	5.00	
2. Equipment	0.00	3.00	24.80
3. Information Technology	0.00	0.00	0.00
4. Library Books & Journals	0.00	0.00	0.00
5. Vehicles	0.00	0.00	0.00
6. Livestock	0.00	0.00	0.00
7. Furniture & fixtures	0.00	2.00	3.70
8. Others (specify)	0.00	0.00	0.00
Total Capital (A)	**0.00**	**10.00**	
B. REVENUE			
1. Establish. expenses Salaries	**139.33**	**155.00**	
i. Establish. Charges-Regular	139.33	155.00	
ii. Establish. Charges-Arrears	0.00	0.00	
2. Traveling Allowances	**10.52**	**21.00**	**19.30**
a) Domestic T.A.	10.52	21.00	19.30
b) Foreign T.A.	0.00	0.00	
3. Research & Operational Expenses	**124.65**	**160.00**	
a) Research	124.65	90.00	
b) Operational	0.00	70.00	
4. Administrative Expenses	**0.00**	**0.00**	
a) Infrastructure	0.00	0.00	
b) Communication	0.00	0.00	
c) Repairs & Maintenance	0.00	0.00	
5. HRD	**0.00**	**7.00**	**0.00**
a) Within India	0.00	7.00	
b) Abroad	0.00	0.00	
6. Other items, if any, (specify)	**0.00**	**7.00**	
Total Revenue (B)	**274.50**	**350.00**	
Grand Total (A+B)	**274.50**	**360.00**	

A. Project Design

Objectives

The objectives of All India Coordinated Research Project on Goat Improvement as approved in XII Plan are as under.

I. To enhance productivity of goat genetic resources of the country in their habitat.
II. To develop germplasm resource centers for goat breeds.
III. To validate and implement breeding, feeding, and health control technologies in the field for improved goat production and health
IV. Capacity building of stakeholders and goat keepers for sustainable and profitable goat husbandry.
V. To determine the role of goat husbandry in livelihood and food security of goat keepers.

Pic. 1 AICRP on Goat Improvement project action plan chart
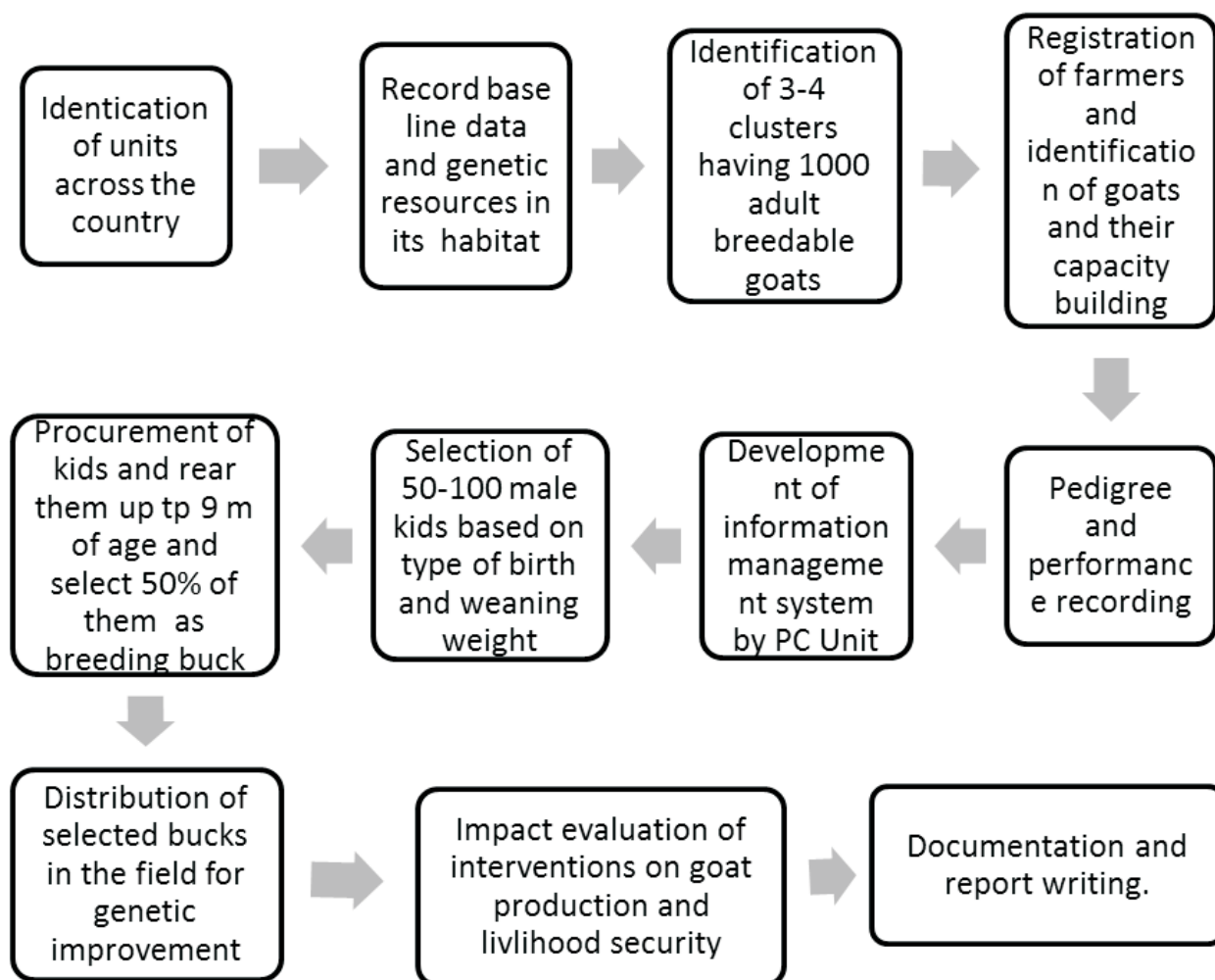
Targets

Table: Targets for each unit covered under the project

Objectives	Measurable Activities	Monitorable target (Success Indicators)	Base value per year	Target per year	Target for project period
Enhance production potential of goat genetic resources of the country in their habitat	Selection of Goat Genetic Resources for base population	12 known and 4 lesser known goat genetic resources	12		16
To develop germ plasm centres for goat breeds	Registration of Clusters and farmers	Selection of 4 village clusters based on avail-ability of goats in habitat of the goat breed	500 adult does	500 adult does	1000 adult does in 4 clusters
	Animal Identification, pedigree and performance recording	Pedigree and production records to evaluate the improvement trend	All adult goats with followers	1000	5000
	Selection of male growers kids on the basis of performance and rear them for buck purpose	Each year approx. 20 bucks will be distributed from project cost	20	10	50
To validate and implement breeding, feeding, health control and product processing technologies in field for improved health and production	Breeding of does in farmers field	Each year minimum of 70% adult does be serviced	700	700	3500
	Health Coverage with vaccination and deworming etc.	Each year min. 2000 goat should be vaccinated for major goat diseases of the area	2000	2000	10000
Capacity building of stakeholders and goat keepers for sustainable goat husbandry	Capacity building of goat keepers and stake holders	All adopted got keepers for one week training in a scientific organization	-	50 per unit	250
To determine role of goat husbandry in livelihood and food and food security	Livelihood and food security	Income per family	-	-	30%

1)   Each field unit will cover, minimum of 1000 and farm unit approx. 300 adult breedable goats and their followers. The maximum number of does covered under field units can be as per flock size and availability of goats in the adopted villages.
2)   Production of approximately 100 superior bucks for breed improvement.
3)   Support breeding about 3000 (field flocks) does with superior bucks provided under the project.
4)   Reduction in Morbidity by 80% in over 5 years period through prophylactic dissemination of modern health control measures mortality below 10%.
5)   Annual Growth in body weight and milk yield as applicable by 1 - 1.5 %
6)   Increase in income of farmers from goat keeping by about 30% in 5 years
Capacity building of all participating farmers, stakeholders and extension workers

Technical Programme
To fulfill the objectives and achieve the targets following technical programme is proposed.

Technical Programme (Farm Units)
·   Each unit will maintain minimum of 300 breedable does and 20 bucks under semi-intensive system of management.
·   Selection of males and females of meat type breeds will be made on the basis of type of birth (singe/twin/triplet) and 9 months body weight of the kid. And for milch breeds, 90 days lactation will also be considered.
·   Second stage selection of females on the basis of type of kidding and first lactation milk yield.
·   Important production data like body weight at different age group (3, 6, 9 and 12 months), milk yield, kidding weight, age and weight at first kidding to be recorded.
·   Culling on production ground will be done on the basis of selection criteria adopted for selection of the does.
·   Morbidity and mortality pattern will be monitored and documented.
·   Selected superior sires will be maintained as the elite germplasm and 500 doses of semen of each elite buck will be stored in the Semen Bank.
·   Each unit will select two to three KVKs with help of Zonal Coordinator, preferably in home tract of the breed and distribute approximately 20 sires each year, free of cost, for improving the production of goats in the farmers' flocks. Technical programme for Field Units will be followed in collaboration with KVKS for improving farmers flock and analyzing the impact.
·   Semen of bucks will be tested for quality before use for breeding.
·   Economics of goat rearing will be analysed.
·   Superior goats will be spared to farmers and appropriate agencies for breed improvement.

Technical Programmes (Field Units)
·   Each unit will survey, identify and map the breeding tract of the respective breed.
·   Each Unit will divide home tract in 4 zones and select 4 clusters from within each zone, so as to explore maximum genetic variation available in the tract. KVK's of the organizations should also be involved if possible.
·   A minimum of 250 breedable does along with their followers will be covered in each of the 4 clusters. Thus the minimum of 1000 breedable does will be covered each year.
·   Each animal will suitably be identified by an identification number. Appropriate technique of animal identification will be used.
·   Based on disease profile, units will prepare Annual Prophylactic Health Calendar to prevent morbidity and mortality. Necessary vaccines/drugs will be purchased from project fund.
·   The performance recording on pedigree, growth, milk yield, reproduction, health etc. will be carried out on each animal adopted under the project.
·   For first stage selection, male kids born from genetically superior does will be identified at

weaning (2-3 m of age). Each year fifty selected kids will be purchased for future buck production and will be preferably reared till the age of final selection either with the help of few progressive farmers of the adopted area on cost/benefit sharing basis or at AICRP Unit. AICRP centers will have to evolve suitable mechanism to rear such kids till the age of final selection.

- Second stage Selection of males and females will be made on the basis of 6/9 month body weight and type of birth (triplets and twins). For milch breeds 90 days milk of dam be considered in selection criteria.
- Multiple born kids will be preferred over single born kids in the selection of future bucks.
- The bucks required for distribution in adopted area will be given free of cost to registered farmers while others can be sold to agencies involved in goat improvement for breed improvement. After two-three breeding seasons bucks will be either rotated amongst clusters to avoid inbreeding or sold outside of adopted area for breed improvement.
- Adopted farmers will be motivated to rear superior male kids for sale as buck at latter stage
- Semen of few selected bucks from each collaborating unit will be collected and preserved by pre-identified units for establishing semen bank.
- The socio-economic studies of goat keepers will be undertaken with respect to income generation and livelihood security.
- Feed and fodder production and plantation of forage trees in the area through distribution of fodder seeds etc.
- Health coverage to all goats in the project area .
- Collection of information on monthly basis from butchers i.e. breeds, age of slaughter, purchase price, preference of consumers. A format will be developed.
- Documentation on markets for live goats and goat products viz. meat, milk, skin, hair and manure.
- Efforts will be made to form goat breeder/ cooperative societies/ self-help groups.
- Training of goat keepers at unit or nearby unit or at CIRG. They should also be taken to another AICRP Centers for learning and interaction.
- Women empowerment in goat husbandry.
- Units with large flock size will setup demonstration units for vermi-compost and show value addition in milk products through product processing demonstrations.
- AICRP Headquarter will develop central database.

CENTRE-WISE PROGRESS REPORT

1. Barbari Unit, CIRG, Makhdoom, Farah, Mathura, Uttar Pradesh

1.1   Principal Investigator:
Dr. M.K. Singh, Senior Scientist (AG&B)

1.2   Activity assigned and targets fixed for each activity during the period

Objectives
1.   To estimate genetic variance of economic traits in goats.
2.   To estimate breeding value of males and females.
3.   In-situ/ex-situ conservation of elite germplasm and its effective utilization.
4.   To estimate production economics of goats under farm conditions.
5.   To validate farm based goat production technologies under field conditions.

Technical Programme
1.   Each unit will maintain 200-300 breedable does and 10 bucks under semi-intensive system of management.
2.   Selection of males and females will be made on the basis of 6 months body weight in small breeds (Black Bengal) and 9 months body weight in medium and large breeds.
3.   Selected of females will also be done on the basis of age and weight at first kidding.
4.   Important production data like body weight at different age group (3, 6, 9 and 12 months), milk yield, kidding weight, age and weight at first kidding to be recorded.
5.   Culling will be done on the basis of selection criteria adopted for selection of the does.
6.   Feedlot studies will be conducted by the nutrition component worker for estimating FCE and carcass characteristics in 10 males up to 6, 9 & 12 months of age.
7.   Disease pattern and control measures will be undertaken by the goat health component worker.
8.   Selected superior sires will be maintained as the elite germplasm and 500 doses of semen of each elite buck will be stored in the Semen Bank by the reproduction component worker.
9.   Superior sires will be distributed for improving the production of goats in the farmers' flocks. Semen of all the bucks will be tested for quality before use for breeding.
10.   Selection differential for body weight to be estimated.
11.   Economics of goat rearing will be analysed in collaboration with NCAP, Delhi.

1.3 Activity carried out during the period

The Farm Unit has been maintaining approximately 300 adult breedable does. Presently the goats are undergoing 15-18 generations of intense selection for body weight growth, milk production and fecundity. The data on body weight growth, milk production, reproduction, health aspects are generated. The controlled breeding is followed and goats are breed in two breeding seasons i.e. I. April-June and II. September-November. Data is then subjected to genetic evaluations using appropriate statistical models. The bucks selected are used at the farm and spared to agencies and farmers for breed improvement purpose. The details performance report is as under

Flock Statistics

The annual flock strength of Barbari goats for the year 2013-14 has been presented in Table 1.1. In total 690 Barbari goats consisting of 443 adult females and 247 bucks, out of which adult population were 272 were available under breed improvement programme on 1-4-2014. Two hundred twenty One (221) genetically superior, does and bucks were sold for grading up, conservation and genetic improvement of farmers flock during the year 2013-14. In all 327 kids were born at the farm

during the year. Overall mortality was 8.25%. At the end of the financial year a total of 690 goats were available. At present 278 females and 80 males were available for selection. The population growth during the year was 147%.

Table 1.1: Flock strength of Barbari goat (2013–14)

Age group	Opening Balance(1 – 4 – 2013)	Closing Balance(31 – 3 – 2014)
Male		
0 – 6 Month	123	104
6 – 9 Month	43	56
9 – 12 Month	02	08
Adult	79	40
Total	**247**	**208**
Female		
0 – 6 Month	108	94
6 – 9 Month	58	43
9 – 12 Month	05	08
Adult	272	249
Total	**443**	**394**
G. Total	**690**	**602**

Body Weight

The overall least squares mean for body weight at birth, 3, 6, 9 and 12 months of ages during the year 2013-14 were 1.77±0.01, 7.63±0.06, 11.21±0.10, 15.71±0.17 and 19.16±0.20 kg respectively. The respective body weight during the year 2012-13 born kids completing performance in the year under report were 1.75±0.02, 7.27±0.09, 11.55±0.26, 14.81±0.38 and 18.19±0.65 kg respectively. The single born kids were significantly heavier than twins or triplets up to 9 months of age (Table 1.2). Kids born during autumn season have attained significantly higher body weight at 6, 9 and 12 months of ages. Single born kids were significantly heavier than those born as multiple. Similarly males were heavier than their counterpart's right from birth to 12 months of ages.

Table 1.2: Least Squares Means of Body weights in Barbari goats

Year	Body weights (kg)				
	Birth	3 Months	6 Months	9 Months	12 Months
2011	1.84±0.02 (577)	7.66±0.09 (555)	11.69±0.14 (531)	16.22±0.19 (508)	19.37±0.22 (489)
2012	1.75±0.02 (443)	7.27±0.09 (384)	11.55±0.26 (96)	14.81±0.38 (74)	18.19±0.65 (25)
2013	1.77±0.01 (2218)	7.63±0.06 (2112)	11.21±0.10 (2102)	15.46±0.14 (1769)	19.16±0.20 (1393)

Milk Production

The lactation performance data was analysed from 2009 to 2013 for non-genetic effects i.e. year, season, type of kidding, parity and polynomial regression of weight of dam at kidding using mixed model least square techniques through LSMLMWPC2 programme. The overall least squares means for 90 and 140 days total lactation yield and lactation length for the does kidded in 2013-14 were 58.10, 81.78, 69.67 liters and 132 days, respectively (Table 1.3). The milk production performance was significantly higher for the year 2013-14. Does kidded during spring season showed

significantly higher milk for 90, 140 days milk yield, lactation yield, and lactation length than those which kidded in autumn season. Ninety days milk yield increases up to 3rd lactation then remained highest in 4th and 5th parity thereafter declined with the advancement of parity order.

Table 1.3: Least Squares Means for Lactational traits in Barbari goats

Year	90 daysM.Y. (lit)	140 daysM.Y. (lit)	Lactational M.Y. (lit)	LactationLength (days)
2011	51.39±0.84(333)	73.81±1.86(120)	60.07±1.14(334)	123.32±1.31(334)
2012	52.91±0.89(281)	79.48±1.91(97)	62.05±1.24(255)	126.48±1.42(255)
2013	58.10±1.04(197)	81.78±1.71(124)	69.67±1.41(197)	132.18±1.64(197)

Table 1.4: Total Milk Production 2010–2014

Sl. No.	Year	Total Milk Production (Liters)
1.	2010 – 2011	11964.2
2.	2011 – 2012	**12962.5**
3.	2012 – 2013	10232.0
4.	2013 - 2014	11100.0

Reproduction

The Overall mean for age and weight first mating, age and weight after first kidding, kidding interval and gestation period were 354.7±6.4 days, 15.01±2.3 kg, 422.3±5.2 days, 16.01±2.3 kg, 221.04±7.2 days and 145.4±1.4 days respectively. Low kidding interval is attributed to rebreeding of as more than 40% females kidded during the same year. Tupping%, breeding efficiency on the basis of does available, kidding % (tupped goat), goat produced multiple birth, and litter size was 86.8, 90.7%, 145.3%, 56.4% and 1.6, respectively (Table 1.5).

Table 1.5: Reproductive Performance of Barbari Goats

Traits	2011-12	2012-13	2013-14
No. of does available	351	337	356
No. of does tupped	327	332	309
Tupping %	93.1	98.5	86.8
Total kiddings	298	307	163
Type of Birth			
Single	141	172	89
Twin	153	129	107
Triplet	4	6	8
Actual live births	459	448	327
Breeding Efficiency			
On the basis of does available	84.9	91.0	66.0
On the basis of does tupped	91.1	92.5	90.07
Kidding %			
On the basis of does available	130.7	133.0	105.8
On the basis of does tupped	140.3	135.0	145.3
Kidding Rate (litter size)	1.54	1.46	1.60

Selection Differential

The selection differential for 9 months body weight was 5.47 kg and that of the dam's 90 days milk yield was 7.09 liters. The high selection differential indicates the further scope of improvement through selective breeding in these goats.

Ranking of bucks

The BLUP estimates of breeding values for all animals were estimated using animal model and ASREML programme. A part list of BLUP values for 90 days part time milk yield. It can be seen that few goats were having very high BLUP estimates indicating their genetic superiority over others.

Health control measures and mortality

Health control measures were practiced as per the standard prescribed by Goat Health Division of the Institute. Deworming and drenching, vaccination for FMD, ET, PPR and dipping to control ecto-parasite were practiced as per schedule and requirement. Diarrhoea/enteritis was major diseases particularly in kids. The overall Mortality was 3.5% during the report year.

Validation of Technology

The superior and true to breed goats were sold to various agencies for breed improvement. The number of goats sold is depicted in Table 1.6. The preferences were given to state government agencies.

Table 1.6: Germplasm supplied for breed improvement during last three years

Sr. No.	Year	Male	Female	Total
1	2010 – 11	134	115	249
2	2011 – 12	141	225	366
3	2012 – 13	158	083	241
4	2013-2014	103	118	221

Revenue Generation

During the financial year 2013-14 the Unit generated resources inclusive of live goats sold, milk produced, skin etc worth Rs. 13.40 lakhs.

1.4   Gaps/constraints/shortfalls / excess and reasons thereof, if any

The adoptions of farmers are at slow speed. Fund utilization has been a great constraint for this Unit. The total fund allocation as per BE was Rs……., Since the Unit failed to utilised major chunk of fund, it was drastically reduced to in first RE even then unit was not able to utilised as per RE, the revised RE was prepared of Rs…….. lakh, sanctioned. Total fund utilization was. Rs…..

1.5   PC's evaluation: Very Good (A); Good (B); poor (C)

————————————Good (B) ————————————

1.6   Future programme identifying the activities, timeline and targets for each of the activity

The Unit has been based on close farm based goat population being maintained in semi-intensive system of management. Following targets are laid down for this Unit.

i.   In XII plan the unit has to work with three KVK's in the district of Agra, Mathura, and Etah available in the home tract of the breed for technology validation, impact evaluation and brining genetic improvement in farmers flock. Necessary fund required for this purpose can be utilized from allocated fund to this Unit.

ii.   Register farmers either through KVK's or directly for technology validation.

iii.   The technical programme XII plan has to be followed by the Unit.

iv.   Distribute approximately 20 bucks to farmers flock for breeding purpose in adopted area under this project on the line of field unit.

v.   Necessary health care to goats in adopted farmers will be provided under the project.

1.7   Remarks

Because of extremely poor fund utilization the unit was rated as good.

2. Jamunapari Unit, CIRG, Makhdoom, Farah, Mathura, Uttar Pradesh

2.1 Principal Investigator

Dr. P. K. Rout, Principal Scientist (AG&B)

2.2 Activity assigned and targets fixed for each activity during the period

The Unit has been based on close farm based goat population being maintained in semi-intensive system of management. Following targets are laid down for this Unit.

i. In XII plan the unit has to work with KVK's in the district of Etawah the home tract of the breed and another KVK where strain of this breed is available in sizeable number for technology validation, impact evaluation, grading up and brining genetic improvement in farmers flock. Necessary fund equired for this purpose can be utilized from allocated fund to this Unit.

ii. To adopt farmers either through KVK's or directly for technology validation.

iii. Distribute approximately 15-20 bucks to farmers flock for breeding purpose in adopted area under this project on the line of field unit.

iv. Necessary health care to goats in adopted farmers will be provided under the project.

2.3 Activity carried out during the period

The Farm Unit has been maintaining approximately 300 adult breedable does along with its followers. Presently the goats are undergoing 15-17 generations of intense selection for body weight growth, milk production and fecundity. The data on body weight growth, milk production, reproduction, health aspects are generated. The controlled breeding is followed in two breeding seasons during April-June and September-November. Data are then subjected to genetic evaluations using appropriate statistical models. The bucks selected are used at the farm and spared to agencies and farmers for breed improvement purpose.

Detailed Achievements

Flock Statistics

Opening balance of the flock was 758 and closing balance was 739. The opening balance of breeding females was 739 and closing balance was 741 (Table 2.1)..The population growth of the flocks was 101.0% and mortality rate was 6.67%. The kidding rate was 1.46% during the period under report. Two hundred thirteen (213) genetically superior, does and bucks each, were sold for grading up, conservation and genetic improvement of farmers flock during the year 2013-14.

Table 2.1: Flock Strength of Jamunapari goat (2012–13)

Age group	Opening Balance(1/4/2013)	Closing Balance(31/3/2014)
Male		
0-1 M	24	32
1-3 M	52	79
3-6 M	79	68
6-12 M	06	04
12-18 M	30	08
Adult	18	20
Total	209	211
Female		
0-1 M	21	32
1-3 M	34	80
3-6 M	75	63
6-12 M	03	09
12-18 M	110	46
Adult	287	300
Total	530	530
G. Total	**739**	**741**

Body Weight

The least squares means of body weights of kids at birth, 3, 6, 9 and 12 months of age during the year 2012-13 were 3.41, 12.11, 15.10, 19.50 and 26.48 kg, respectively (Table 2.2). Parity of dam had significant on kid's body weight up to 6 months of age. Male kids maintained higher weights at all growth stages over their counterpart. Kids born as single also showed significantly higher weights than those born as twins or triplets. The Average Daily Weight Gain (ADG) of the kids under intensive management were 73.89, 120.78, 111.89 and 102.18 g/day, respectively during 3-6, 6-9, 9-12 and 3-12 month age group. The mean of body weights of kids at birth, 3, 6, 9 and 12 months of age over the year were 3.4, 12.11, 15.10, 19.50 and 26.48 kg, respectively.

Table 2.2: Least Square Mean of Body Weight Growth (Kg) in Jamunapari Goats

Year	Weight at				
	Birth	**3M**	**6 M**	**9 M**	**12 M**
2011	3.17±0.04	10.92±0.13	14.99±0.22	19.41±0.28	23.37±0.36
	(466)	(448)	(428)	(401)	(348)
2012	3.17±0.04	09.63±0.14	14.55±0.26	18.65±0.38	22.91±0.48
	(346)	(333)	(181)	(131)	(118)
2013	3.41	12.11	15.10	19.50	26.48

Milk Production

Milk production data of 2217 Jamunapari goat during the period 1995 to 2012 was analysed. The mean of 90 days, 140 days and lactation milk yield of the Jamunapari goat over the 17 years was 80.18, 113.98 and 124.82 litre, respectively. The average lactation yield was 124.82 litres with a lactation length of 179.5 days. Means, standard deviations, and coefficients of variation are also shown in the table 2.3.

Table 2.3: Data structure and means, standard deviations and standard errors for milk yield and lactation length traits

Factor	90 days MY	140 days MY	Lactation MY	Lactation Length
Number of Records	2217	1788	2099	2099
Number of does	2217	1788	2099	2099
Number of years	17	17	17	17
Mean	80.18 litre	113.98 litre	124.82 litre	179.5 days
SD	33.3	38.1	51.06	42.17
Standard error	0.708	0.90	1.11	0.92
CV	41.6	33.48	40.90	23.49
Range/ Maximum	21.8-168.0	46.8-233.6	33.0-273.7	70-277

The log-likelihood obtained for each trait in four different models was compared (Table 2.5). The most appropriate model for milk yield at 90, 140 and lactation yield was animal and maternal effect. The appropriate model for lactation length was direct (animal + PE) effect. Parameter estimates fitting the most appropriate model for milk yield and lactation length was presented in Table 2. The estimates of direct heritability for MY90, 140 MY, LMY and LL were 0.577, 0.765, 0.781 and 0.148, respectively. The maternal variance and variance due to permanent environment were very low for all the traits under study. The maternal permanent environmental component due to dam and litter contributed negligibly. The heritability estimates across different traits with small standard errors (varies from 0.015 to 0.036) resulted from the large size of the data and the precise estimate showed the genetic improvement for milk production for 90 days and 140 days period will be successful by selection.

Table 2.3: Model effect and genetic parameter

Components	MY90		MY140		LMY		LL	
	Anim	Maternal	Anim	Maternal	Anim	Maternal	Anim	PE
var direct	55329.2	54825.8	98190.3	95471.2	149108	138727	267.162	217.488
var-maternl		723.148		3137.35		11358		
Var-pe								88.1905
var-res	39473.2	39422.3	26223.3	26148.4	27505.6	27358.8	1181.9	1158.29
pheno	94802	94971	1.24E+05	1.25E+05	1.77E+05	1.77E+05	1.45E+03	1.46E+03
se	4404.4	4427.8	6629	6649.9	8959.8	9016.6	50.329	51.913
h²	0.5836	0.5773	0.7892	0.7653	0.8443	0.7818	0.1844	0.1486
se	0.0267	0.0367	0.0152	0.0351	0.0106	0.035	0.0312	0.033
mat²		0.0076		0.0251		0.064		
se		0.0282		0.0329		0.0346		
Log L	-3242.6	-3242.59	-10580.7	-10580.4	-2573.18	-2571.15	-8557.1	-8553.05

Reproduction

Reproductive performance of Jamunapari goats in terms of breeding efficiency and kidding percent on the basis of does tupped were 86.03% and 121.10%, respectively. The kidding rate was 1.46 (Table 2.5). During this year, a total of 254 does kidded 373 kids, out of which single, twin and triplet born kids were 138, 113 and 3, respectively.

Table 2.5: Reproduction performance of Jamunapari goats

Sl.No.	Particulars	2011-12	2012-13	2013-14
1.	No. of available does for breeding (X)	362	377	422
2.	No. of does bred (Y)	322	349	365
3.	Tupping % (Yx100)/X)	88.95	92.57	86.49
4.	Does kidded	268	254	254
	Single (C)	172	177	138
	Twin (D)	90	73	113
	Triplet (E)	06	04	03
5.	Actual live birth (I)	370	335	373
6.	Breeding efficiency/fertility			
	(a) On the basis of does available	83.33	84.85	72.60
	(b) On the basis of does tupped	90.45	94.59	86.03
7.	Kidding (%)(a) On the basis of does available	116.06	110.12	102.19
	(b) On the basis of does tupped	125.08	125.00	121.10
8.	Kidding rate (litter size)	1.40	1.38	1.46

Genetic parameters

Genetic parameters for body weights at various stages of growth and milk production traits were estimated. The heritability estimates for body weights at birth, 3, 6, 9 and 12 month age were 0.146±0.073, 0.743±0.157, 0.656±0147, 0.512±0.129 and 0.293±0.097, respectively. The heritability estimates for 90 day and 140 day milk yield were 0.390±0.112 and 0.343± 0.114, respectively (Table 2.6).

Table 2.6: Heritability estimates for milk production and growth traits

Traits	Estimates
Birth weight	0.146±0.073
3 month weight	0.743±0.157
6 month weight	0.656±0147
9 month weight	0.512±0.129
12 month weight	0.293±0.097
90 day milk yield	0.390±0.112
140 day milk yield	0.343± 0.114

Supply of elite Germplasm

Elite breeding bucks were supplied to various organization and goat breeding for improvement in productivity (Table 2.7). During the year 2013-2014, 213 superior germplasm (117 bucks and 96 does) were provided to breeders for breed improvement.

Table 2.7: Germplasm supplied for breed improvement during last 4 years

Year	Male	Female	Total
2010-11	65	34	99
2011-12	121	91	212
2012-13	119	61	180
2013-14	117	96	213

Revenue generation

The revenue generated source and total revenue generated for the flock during the year 2013-14 was more than Rs. **11.93** Lakhs through sale of milk, culled animals, bucks/does, skin and manure etc.

2.4   Gaps/constraints/shortfalls / excess and reasons thereof, if any

The Unit has taken steps to adopt farmers of the field. However greater emphasis is to be given in field performance recording and impact of technology validation. The staff required is not as per approval.

2.5   PC's evaluation: Very Good (A); Good (B); poor (C)

————————————————Good (B) ————————

2.6   Future programme identifying the activities, timeline and targets for each of the activity

The Unit has been based on close farm based goat population being maintained in semi-intensive system of management. Following targets are laid down for this Unit.

As per technical programme of the Unit approved under XII Plan

2.7   Remarks

The Unit has performed satisfactorily. Superior goats have been spared by the Unit to various agencies for breed improvement.

3. Sirohi Unit, CSWRI, Avikanagar, Rajasthan

3.1   Principal Investigator
Dr. S.S. Misra, Senior Scientist (AG&B)

3.2   Activity assigned and targets fixed for each activity during the period
i.   Objectives and technical programme as per approved XII Plan SFC and given in PC unit. Apart from implementation of approved technical programme, unit is allocated following work.

ii.   In XII plan the unit is to work with two KVK's in the home tract of the breed for technology validation, impact evaluation, grading up and brining genetic improvement in farmers flock. Necessary fund required for this purpose can be utilized from allocated fund to this Unit.

iii.   To adopt farmers either through KVK's or directly for technology validation.

iv.   The technical programme as approved in the XII plan / Annual Review Meet has to be followed by the Unit.

3.3   Activity carried out during the period
The experiment of Unit is based on closed herd population of Sirohi goats maintained under semi-intensive system of management. Performance recording, genetic selection to bring improvement in Sirohi goat for meat and milk production has been carried out. Sale of superior Sirohi goat germplasm to the farmers/NGO/Govt organizations were made for genetic improvement of their goats in the field flock. The detail achievement is narrated below.

The flock statistics of Sirohi goats under field unit is shown in Table 3.1. The flock strength of registered animals under field unit was 1220 including 980 females as on 31 March, 2014. During the year 2013-14, addition due to birth was 496 while reduction due to death and sale of animals were 66 and 619 respectively. Total 1465 animals among different age group were draft during the report period.

Table 3.1: Flock Statistics of Sirohi goats (2013–14)

Centres	Opening Balance(1.4.2013)	Closing Balance(31.3.2014)
Male:		
0 – 1 M	5	12
1 – 3 M	79	54
3 – 6 M	135	99
6 – 12 M	51	49
Adult	54	26
Total (M)	324	240
Female:		
0 – 1 M	7	11
1 – 3 M	75	66
3 – 6 M	140	124
6 – 12 M	79	51
Adult	784	728
Total (F)	**1085**	**980**
Grand Total	**1409**	**1220**

Table 3.1(A) : Flock Statistics of Sirohi goats (2010–14)

Age groups	Closing 31.3.10	Closing 31.3.11	Closing 31.3.12	Closing 31.3.13	Closing 31.3.14
Male	132	155	146	196	211
Female	477	463	433	484	446
Total	609	618	579	680	657

Population growth

Considering the initial adult does the growth of the population is recorded to be 81.75%.

Table 3.2: Population Growth (%) period (2013-14)

Year	Initial strength (A)	No of kids born(B)	Total (A+B)=C	No of animals died(D)	Population growth (%)
2009-10	609	243	852	10	38.25
2010-11	609	223	832	08	35.31
2011-12	618	245	863	33	34.30
2012-13	579	283	862	51	40.07
2013-14	680	251	931	39	31.18

Population growth %=((B-D)/ A) X 100

Body weight/growth

The body weights of kids at different ages have been presented in Table 3.3. The overall body weight at birth, 3, 6, 9 and 12 months of age was 2.46±0.03, 13.72±0.19, 18.00±0.29, 21.83±0.53 and 26.32±0.51 kg, respectively. Period (year) had significant effect on body weight at different age groups. Season of kidding had significant effect on body weight. Male and single born kids were significantly heavier over females and multiple born kids. The heritability of body weight at birth was moderate to high as at other different ages was found to be higher. The genetic correlation among 3, 6, 9 and 12 month was high and positive. The phenotypic correlation coefficients of birth weight with 3, 6 and 12 months of body weight were also positive (Table 3.4).

Table: 3.3 Least Squares Mean of Body Weight Growth (Kg) in Sirohi Goat

Factor	Weight at				
	Birth	3 M	6 M	9 M	12 M
2011-12	2.47±0.04 [c] (668)	14.45±0.22 [c] (570)	19.26±0.33[e] (406)	23.83±0.56 [e] (301)	29.05±0.61[d] (220)
2012-13	2.50±0.04[cd] (651)	14.42±0.22 [c] (590)	18.09±0.33[d] (407)	22.88±0.57[d] (307)	27.77±0.62[c] (203)
2013-14	2.54±0.04 [d] (496)	13.98±0.25 [b] (371)	19.34±0.38[e] (160)	23.31±0.80[cde] (27)	-

Table: 3.4 Heritability (Diagonals) Genetic (Below Diagonals) And Phenotypic (Above Diagonals) Correlations for Body Weight in Sirohi Goats

Weight at	Birth	3M	6M	9M	12M
Birth	**0.469±0.107**	0.446	0.366	0.308	0.228
3 M	0.387±0.148	**0.689±0.135**	0.676	0.529	0.443
6 M	0.273±0.164	0.757±0.075	**0.564±0.120**	0.725	0.555
9 M	0.416±0.152	0.773±0.0.78	0.938±0.031	**0.499±0.111**	0.681
12 M	0.059±0.182	0.599±0.116	0.757±0.084	0.719±0.89	**0.461±0.106**

Body Measurements

The biometrics dimensions of Sirohi goats at different ages and sex have been estimated. At 12 month of age the Body Height, Body Length, and Heart Girth in males were 68.11±1.01 cm, 62.44±1.14 cm and 68.55±1.02 cm and females were 66.25±1.00 cm, 60.55.±1.13 cm and 66.71±1.01 cm, respectively.

Lactation Performance

The overall mean for 90, 150 days milk yield and total lactational yield was 72.08±2.79, 104.29±3.49 and 104.60±3.45 lit., respectively (Table 3.5). Year of kidding affected the 90, 150 days and lactation milk yield. The overall lactation length was 151.11± 0.37 days. The production performance in terms of 90, 150 days milk yield and total lactation yield improved over years. Doe kidded during November – February, had significant higher milk yield as compared to doe kidded during other seasons. The lactation order played a significant role in milk yield. The heritability of 90 days and total lactation milk yield was found to be higher. The phenotypic correlation between 90 days yield and lactation length was high and positive. The genetic association between 90 days milk yield and lactation yield was positive.

Table 3.5: Lactational Performance of Sirohi Goats

Factor	90 days milk(lit)	150 days milk(lit)	Lactation yield(lit)	Lactation length(days)
2011-12	72.02±2.87 [c] (399)	105.18±3.63 [c] (269)	105.19±3.60 [c] (269)	150.43±0.44 [b] (269)
2012-13	75.21±2.89 [d] (402)	107.22±3.69 [c] (254)	107.09±3.66 [c] (254)	149.65±0.47 [a] (254)
2013-14	85.96±3.06 [e] (309)	119.10±3.98 [d] (210)	118.95±3.96 [d] (210)	149.75±0.59 [a] (210)

Selection Differential

The selection differential of selected males for 3 months body weights and 90 days milk yield of dam were estimated. Thirty Eight male kids were selected, on basis of 3 month body weight and 90 days milk yield for future breeding purpose (VII set). The selection differential of 4.89 kg body weight and 9.75 lit. milk yield of dam for 90 days over population mean.

Reproductive Performance

The age at first matting and first kidding was 447.11±28.02 days and 590.73±27.98 days, respectively. The overall age at first matting and first kidding was 537.10±9.14 and 686.31±9.13 days, respectively. On the other hand, weight of doe at first matting and first kidding was 27.39±0.29 and 30.11±0.27 kg, respectively. The service period and kidding interval was 278.68±9.48 and 428.82±9.43 days, respectively. The overall gestation period of Sirohi goats is recorded as 150.14±0.18 days.

Health Control Measures

Total 1250 and 600 animals were vaccinated against Enterotoxaemia and PPR during report year. Total 2145 and 2840 animals were covered under treatment to control the endo and ecto-parasitic infestation, respectively. A total of 949 animals were treated for different diseases. Even after regular deworming of the registered animals, Enteritis was encountered as a major disease affecting the goats during the report period, followed by pneumonia. The overall mortality was 1.97%.

Practical Utility

·   Base line information about breed parameters for body weights and body measurements at

various ages, production and reproduction traits, socio economic status of goat breeder have been generated. A brochure will be prepared for the breed descriptor of Sirohi goats.

· The technologies provided by the project staff to the goat keepers have helped to reduce mortality and increase growth rate as well as milk production.

· The farmers are taking interest to bring breeding bucks from other flocks or from nearby village to avoid inbreeding.

· The project is of immense help to conserve the breed in its native tract.

It is of great help for farmers who don't have their own breeding bucks. The farmers are assured of good breeding bucks.

3.4   Gaps/constraints/shortfalls/excess and reasons thereof, if any

1. Shortage of scientific, technical and administrative staff in the project.
2. Insufficient budget allocation.

3.5   PC's evaluation: Very Good (A); Good (B); poor (C)

———————————— Good (B) ————————————

3.6.   Future programme identifying the activities, timeline and targets for each of the activity

In XII plan the unit is to work with two KVK's in the home tract of the breed for technology validation, impact evaluation, grading up and brining genetic improvement in farmers flock. Necessary fund required for this purpose can be utilized from allocated fund to this Unit.

v.   To adopt farmers either through KVK's or directly for technology validation.

vi.   The technical programme as approved in the XII plan / Annual Review Meet has to be followed by the Unit.

vii.   Distribute approximately 15-20 bucks to farmers flock for breeding purpose in adopted area under this project on the line of field unit.

viii.   Necessary health care to goats in adopted farmers will be provided under the project.

ix.   Performance recording of filed flock has to be carried out.

3.7   Remarks

The performance of goats has gone down in the year of report. Therefore rated as B.

4. Assam Hill Goat Field Unit Research Station, Assam Agricultural University, Burnihat, Assam

4.1   Principal Investigator

Dr.Naba Nahardeka Professor (AG&B), AAU, Burnihat, Assam

4.2   Activity assigned and targets fixed for each activity during the period

Apart from implementation the unit was assigned following work.

I.   It was suggested to take up the issue of breed characterization of Assam Hill Goat in collaboration with NBAGR, Karnal.

II.   Creation of Self Help Groups involving women should be promoted in the adopted area.

III.   Impacts analysis of improved breeding and health cover facilities should be carried out and documented.

IV.   The Unit is getting sufficient budget form the project under NEH plan. Therefore, the Unit may adopt one additional cluster in distant location to document variation in the genetic groups.

V.   Identification, selection and rearing of approximately 100 kids for future bucks. The selection should based on type of birth and weaning weight.

VI.   Distribution of superior bucks amongst farmers of adopted villages and also to the goat farmers of the state for genetic improvement purpose.

VII.   Distribution of fodder tree saplings and development of fodder plots at farmers' door.

VIII. Organization of animal health, vaccination and deworming camps, trainings to the farmer in the field units.

IX.   Establishment of elite flock.

X.   Development and execution of a health and fodder calendar.

XI.   Documentation of the breed.

4.3   Activity carried out during the period

This is a field based unit. Major work on pedigree and performance recording, bringing upon genetic improvement have been carried out on farmers flock distributed over various clusters. Following are the detail of work carried out and achievements made so far.

Detailed Achievements

The Project covers four clusters namely Batabari in Mangoldoi district, Tetelia and Tepesia in Kamrup (M) district and Nahira in Kamrup (R) district. The total number of beneficiaries in these four clusters are 209 with 1667 numbers of goats. Thirty four selected bucks of superior quality, true to the breed have been distributed to the field units and NGOs of the state. A total of 5000 doses of frozen semen of Assam Hill Goat from selected elite buck have been stored. Training on "**Scientific**

management of Goats" and other necessary technical guidance is provided to the beneficiaries at regular interval. Regular Health check-up Camp is organized at the field units. Vaccination and deworming schedule is being followed at the two units.

Flock Statistics

On the basis of the survey four field units, namely, Batabari (FU-1) in Darrang district, Tetelia (FU-2) in Kamrup (Metro) district, Nahira (FU-3) in Kamrup (Rural) district and Tepesia (FU-4) in Kamrup (Metro) district were selected with an average goat population of 700 in each unit. The opening balances of goats were 515, 455, 244 and 334 at Batabari, Tetelia, Nahira and Tepesia filed units, respectively. With population growth of 106.26%, the closing balance has raised to 624, 514, 210 and 291, respectively in the above field units (Table 4.1)

Table 4.1: Flock Statistics of Assam Hill Goat

Centres	Opening Balance(1.4.2013)	Closing Balance(31.3.2014)
Male:		
0 – 1 M	63	60
1 – 3 M	170	207
3 – 6 M	77	107
6 – 12 M	83	104
Adult	75	90
Total (M)	468	568
Female:		
0 – 1 M	66	45
1 – 3 M	161	248
3 – 6 M	102	170
6 – 12 M	163	163
Adult	588	473
Total (F)	**1080**	**1099**
Grand Total	**1548**	**1667**

Body Weight Growth

The average body weight of goats according to age, sex and type of kidding is given in Table 4.2. Male animals were found to be heavier than females in all the age groups, whereas the single born kids were recorded as superior over twining and triplet born kids.

Table: 4.2 Average body weight (kg) of goats according to type of birth in different field units (2013-14)

TOK	Birth wt		3 M wt		6 M wt		9 M wt		12 M wt	
	M	F	M	F	M	F	M	F	M	F
Single	1.30±0.02	1.24±0.03	5.55±0.23	5.66±0.14	8.67±0.30	7.70±0.19	11.33±0.30	10.16±0.20	13.51±0.32	12.81±0.29
	(291)	(256)	(251)	(235)	(201)	(212)	(151)	(177)	(77)	(86)
Twin	1.22±0.06	1.18±0.05	4.98±0.08	4.81±0.09	7.61±0.23	7.41±0.12	10.10±0.42	9.69±0.13	13.44±0.29	12.77±0.25
	(427)	(413)	(301)	(299)	(197)	(164)	(111)	(123)	(86)	(91)
Triplet	1.19±0.01	0.98±0.05	4.79±0.24	4.55±0.17	7.42±0.29	7.33±0.21	10.16±0.51	9.55±0.29	13.43±0.25	12.79±0.60
	(99)	(119)	(72)	(101)	(51)	(77)	(39)	(56)	(29)	(33)
Overall	1.28±0.02	1.13±0.01	5.22±0.07	4.99±0.05	7.9±0.08	7.51±0.10	10.56±0.49	9.86±0.12	13.51±0.34	12.86±0.32
	(817)	(788)	(624)	(635)	(449)	(264)	(301)	(356)	(192)	(210)

Population Growth (%)

Considering the initial adult does the growth of the population is recorded to be 106.26%.

Table 4.3: Population Growth Under Report Period (2013-14)

Year	Initial Adult Does(A)	No of Kids(B)	Total (A+B=C)	No of kids died (D)	Population Growth (%) (B-D)/C*100
2013-14	751	928	1679	130	106.26

Reproduction

The average age, weight at first service and first kidding in all the four units were recorded 257.95±7.07 days, 9.93±0.23 kg, and 412.98±15.44 days and 13.92±0.29 kg, respectively. The service period, kidding interval and gestation period for the field units were observed to be 87.41±5.32, 232.61±4.89 and 147.51±0.59 days respectively (Table 4.4). Out of 592 kidding, 928 kids were born of which single born kids were observed to be highest (51.69%) were followed by twins (39.86%) and triplets (8.45%) (Table 4.4).

Table: 4.4 Reproductive Performance of Assam Hill Goat (2012-13)

Sl. No.	Traits	Mean ± SE (N)
1	Age at 1st service (days)	257.95±7.07 (239)
2	Wt at 1st service (kg)	9.93±0.23 (227)
3	Age at 1st kidding(days)	412.98±15.44 (247)
4	Wt at 1st kidding (kg)	13.92±0.29 (253)
5	Service Period (days)	87.41±5.32 (201)
6	Kidding interval (days)	234.61±4.89 (216)
7	Gestation period (days)	147.51±0.59 (287)

Evaluation of Carcass Characteristics

During 2013-14, a total of 30 Assam Hill Goats were studied for their meat quality and carcass characteristics. Ten animals of marketable age from each of the groups viz. Castrated, Non-Castrated and Females were subjected to various carcass related studies. During the study from meat production point of view, it was found that, castrated males were the best for carcass quality followed by non-castrated and females.

Table: 4.5 Carcass Characteristics of Assam Hill Goat

Particulars	Castrated	Non Castrated	Female
Live Wt. (kg)	13.44±0.65	11.57±0.34	10.65±0.48
Dressed Wt. (kg)	6.86±0.29	5.64±0.19	5.15±0.24
Hot Dressing %	51.13±0.41	48.67±0.35	48.39±0.32
Cold Dressing %	47.39±0.52	45.10±0.58	45.09±0.60
Carcass Length (cm)	59.78±1.41	57.02±1.21	55.80±1.17
Wt. of Pluck (kg)	0.452±0.04	0.418±0.03	0.393±0.02
Wt. of Inedible Offal (kg)	4.07±0.21	3.33±0.10	3.27±0.26
Wt. of Skin (kg)	1.05±0.05	0.9±0.05	0.85±0.08

Health Control Measures

Regular health control measures were practiced in the field units. Due to hot and humid climate, the animals are very prone to ecto as well as endo parasites. Deworming and vaccination of the animals against Enterotoxaemia twice in a year and PPR once in three year is a routine practice.

Table: 4.6 Prophylactic Treatments

Sl. No.	Prophylactic measured	Number of animals
1.	Deworming	3021
2.	Dipping	3256
3.	Vaccination FMD	-
4.	Vaccination E.T.	2568

5.	Vaccination PPR	788
6.	Vaccination H.S./ other	-
7.	Drenching	721
8.	Others/ Oxy. L.A./ camps	5561

4.4 Gaps/constraints/shortfalls/excess and reasons thereof, if any
· Under field condition there is less control over breeding of the goats.
· Generally the farmers don't rear male animals for breeding. Elite male with high productive and reproductive values are distributed for proper and systematic breeding of the animals.
· Less knowledge about the health measures, nutrition, housing, etc were initially observed among the beneficiaries. The implementation of the project has helped them a lot in improving all these aspects by trainings, holding awareness camps/ health camps etc.
· Full proof animal identification system may be standardized.

4.5 PC's evaluation: very good (A) Good (B) poor (C)
—————————————Very Good (A) ———————————

4.6 Future programme identifying the activities, timeline and targets for each of the activity
Since, the Unit is actively engaged in brining upon improvement in farmers flock following activities are to done priority basis.
1. The Unit is getting sufficient budget form the project under NEH plan. Therefore, the Unit may adopt one additional cluster in distant location to document variation in the genetic groups.
2. Identification, selection and rearing of approximately 100 kids for future bucks. The selection should based on type of birth and weaning weight.
3. Distribution of superior bucks amongst farmers of adopted villages and also to the goat farmers of the state for genetic improvement purpose.
4. Distribution of fodder tree saplings and development of fodder plots at farmers' door.
5. Organization of animal health, vaccination and deworming camps, trainings to the farmer in the field units.
6. Establishment of elite flock.
7. Processing and preservation of frozen semen of Assam Hill Goat.
8. Development and execution of a health and fodder calendar.
10. Documentation of the breed.

4.7 Remarks
The unit is doing very good work in field conditions.

5. Black Bengal Field Unit, West Bengal
University of Animal & Fishery Sciences, Kolkata, West Bengal

5.1   Principal Investigator

Dr. P.K. Senapati Professor Animal Breeding, WBUAS, Kolkata

5.2   Activity assigned and targets fixed for each activity during the period

Apart from implementation of technical programme, he unit was assigned fllowing activities.

i.   Identification, selection and rearing of approximately 100 kids for future buck production. The selection of male kids should based on type of birth and weaning weight.

ii.   Distribution of superior bucks amongst farmers of adopted villages and also to the goat farmers of the state for genetic improvement purpose.

iii.   Distribution of fodder tree saplings and development of fodder plots at farmers' door.

iv.   Organization of animal health, vaccination and deworming camps, trainings to the farmer in the field units.

v.   Promote Artificial Insemination in field centres.

vi.   Processing and preservation of frozen semen. .

vii.   Development and execution of a health and fodder calendar.

viii.   Documentation on Impact of the project, production and economic status of farmers.

5.3   Activity carried out during the period

This is a field based unit. Major work on pedigree and performance recording, bringing upon genetic improvement have been carried out on farmers flock distributed over various clusters. Following are the detail of work carried out and achievements made so far.

Detailed Achievements

Black Bengal Field Unit is under the West Bengal University of Animal and Fisheries Sciences, Kolkata. The Goat improvement work has been undertaken in this area. The project involved 1672 numbers of registered Black Bengal doe reared by 374 registered goat farmers rearing in four village clusters of four Gram Panchayat of three different blocks in two Districts (Nadia- Ayeshpur and Ganguria, South 24 Parganas – Rangabelia and Murshidabad- Bamunia) of west Bengal.

Flock Statistics

The flock statistics of Black Bengal goat during the period 2013-14 in 4 village–centers is presented in Table 5.1. The total population at the end of the year was 1672. Adult number of doe is 623 and male goat was 69 in the population. A total of 1808 kids were born and 1031 goat were sold during the year. Mortality number is 273 contributing 6.80% of the total population. The population growth during the report period was 53.65 %.

Table 5.1: Flock Statistics of Black Bengal goats during the period 2013-14

Centres	Opening Balance(1.4.2013)	Closing Balance(31.3.2014)
Male:		
0 – 3 M	185	169
3 – 6 M	158	180
6 – 12 M	103	85
Adult	60	69
Total	506	503
Female:		
0 – 3 M	164	177
3 – 6 M	128	162
6 – 12 M	134	107
Adult	547	604
Total	973	1050
Grand Total	**1479**	**1553**

Body Weight

The least squares means for sex wise body weight has been presented in Table 5.2. The body weight during the year 2013-14 at birth, 3, 6 and 9 month of age were 1.187±0.010, 4.773±0.06, 7.316±0.102 and 9.787±0.114 kg, respectively. While the body weight during the year 2012-13 at birth, 3, 6 and 9 month of age were 1.23±0.01, 4.92±0.10, 7.62±0.12 and 10.60±0.25 kg, respectively. Variation in body weight at different ages is significant for all village units. The highest birth weight was recorded at Ganguria village unit (1.303±0.018 kg), followed by Ayeshpur (1.205±0.015 kg) and lowest at Rangabelia (1.031±0.018 kg). At 3 months of age the highest body weight was recorded at Ganguria village unit (5.241±0.119 kg), followed by Rangabelia (4.614±0.117 kg) and lowest at Ayeshpur (4.418±0.106 kg). But at 6 and 9 months of age the highest body weight was recorded at Rangabelia village unit (7.788±0.172 kg and 10.435±0.197 kg), followed by Ganguria (7.624±0.177 kg and 9.891±0.167 kg) and lowest at Ayeshpur (6.381±0.178 and 8.752±0.242 kg). This probably indicates the higher genetic potential of does and bucks as well as better nutrition received by them due to better care taken by the owners. Body measurements viz. body height; body length, heart girth, paunch girth, ear length and horn length at different ages are also reported.

Table 5.2: Least Square Means of Body weight growth (Kg) in Black Bengal Goat

Year	Birth	3M	6 M	9M
2010-11	1.21 ± 0.01^{bc} (1776)	5.19 ± 0.08^{c} (1037)	8.05 ± 0.14^{de} (541)	10.42 ± 0.25^{c} (224)
2011-12	$1.24^{c} \pm 0.01^{c}$ (1633)	5.45 ± 0.06^{d} (970)	7.98 ± 0.10^{de} (802)	10.59 ± 0.15^{bc} (567)
2012-13	1.23 ± 0.01^{c} (1808)	4.92 ± 0.10^{a} (1159)	7.62 ± 0.12^{bc} (664)	10.60 ± 0.25^{c} (371)
2013-14	1.187 ± 0.010 (934)	4.773 ± 0.066 (769)	7.316 ± 0.102 (655)	9.787 ± 0.114 (447)

Genetic Parameters

The birth weight is low heritable 0.034 ± 0.046 in the population. The heritability increase with advancement of age and the highest value at 9 month age is 0.648 ± 0.054. Genetic and phenotypic correlation of body weight was also calculated and found that all are positively correlated.

Reproduction

The age at first service and first kidding was 304.47±23.77 days and 439.17±24.67 days respectively in 2013-14, which is higher than in previous years (Table 5.3). In the report year, the weight of doe at first service and first kidding was 9.67±0.55 Kg and 12.69±0.28 Kg, respectively with 80.49±3.54 days as service period, kidding interval was 234.47±4.56 days with 146.14±0.12 days of gestation period (Table 5.3). In 2013 -14, out of 521 kidding, 956 kids were born of which twin born kids are the highest (54.51%), followed by singlet (31.86 %), triplet (11.90 %), quadruplet (1.54 %) and quintuplet kids (0.19 %) respectively.

Table 5.3: Least square Mean for Reproductive traits in Black Bengal Goats

Sl.No.	Particulars	2011-12	2012-13	2012-13
1	Age at first service (d)	239.8±2.57	237.3±2.21	304.47±23.77 (17)
2	Wt at first service(kg)	10.47±0.19	10.48±0.15	9.67±0.55 (17)
3	Age at first kidding (d)	384.4±1.25	379.0±2.39	439.17±24.67 (17)
4	Wt at first kidding(kg)	14.08±0.18	14.44±0.14	12.69±0.28 (17)
5	Service Period (d)	62.78±2.19	61.60±1.55	80.49±3.54 (124)
6	Kidding interval(d)	206.2±2.66	204.9±2.09	234.47±4.56 (134)
7	Gestation period(d)	144.7±1.28	144.4±1.40	146.14±0.12 (521)

4.4   Gaps/constraints/shortfalls/excess and reasons thereof, if any

Not applicable.

4.5   PC's evaluation: very good (A) Good (B) poor (C)

——————————————Very Good (A) ————————————

4.6   Future programme identifying the activities, timeline and targets for each of the activity

Since, the Unit is actively engaged in brining upon improvement in farmers flock following activities are to done priority basis.

ix.   Identification, selection and rearing of approximately 100 kids for future buck production. The selection of male kids should based on type of birth and weaning weight.

x.   Distribution of superior bucks amongst farmers of adopted villages and also to the goat farmers of the state for genetic improvement purpose.

xi.   Distribution of fodder tree saplings and development of fodder plots at farmers' door.

xii.   Organization of animal health, vaccination and deworming camps, trainings to the farmer in the field units.

xiii.   Promote Artificial Insemination in field centres.

xiv.   Processing and preservation of frozen semen. .

xv.   Development and execution of a health and fodder calendar.

xvi.   Documentation on Impact of the project, production and economic status of farmers.

4.7 Remarks

This unit has been doing good work and has been able to show positive impact in farmers flock especially on health, fecundity and body weight growth.

6. Black Bengal Field Unit, Birsa Agricultural University, Kanke, Ranchi-Jharkhand

6.1   Principal Investigator:
Dr. L.B. Singh, Professor (AG&B)

6.2   Activity assigned and targets fixed for each activity during the period
Apart from implemention of technical programme the unit was assigned the duty of field performance recoding at four clusters established at Deoghar, East Singhbhum, Ranchi and Lohardaga districts.

6.3   Activity carried out during the period
This is one of the unique two units under AICRP on Goat Improvement having adopted farmers under Tribal Sub Plan. Due to this unit, the tribal farmers are being benefitted and their capacity is enhanced. The Unit is to do genetic improvement of tribal area Black Bengal goats through section based on performance recording. Work done and achievements are discussed below.

1.   A new village Tiko having 194 does in Lohardaga district was adopted in October 2013. Thus this unit is now working in all four centres namely Palajori (Deoghar district), Beko (East Singhbhum district), Chamguru (Ranchi district) and Tiko (Lohardaga district) having around 1042 does in coverage areas.

2.   21 elite bucks and 8 does on the basis of growth and multiple births were selected and purchased to establish the elite Black Bengal seed at the university farm. Out of these purchased bucks **8** bucks distributed at new centre i.e. Tiko village of Lohardaga district for breeding and improvement purposes.

3.   Selection differential was estimated to be 4.02 kg in males at 9-month of age than the previous year estimated as 3.39 kg.

4.   The mortality in adult goats and kids were reduced up to 93.07% in the farmer's flock.

5.   Health measure was under taken as vaccination (PPR, ET, Goat Pox), dipping, drenching and treatment of sick animals in the coverage areas as required.

6.   Goat feed prepared by our university and Mineral mixture were distributed among the farmers which encouraged the farmers to keep the elite and large flock size of Black Bengal goats.

7.   Two training programmes on goat husbandry was organized at Goat farm of Ranchi Veterinary College, BAU, in which 26 goat farmers from different four centres participated and benefited by learning by doing on scientific goat rearing.

Detailed Achievements
All India Coordinated Research Project on Goat breeding for meat production of was started at Ranchi Veterinary College, Ranchi during Vth five year plan in November, 1976 as Chotanagpur unit. This unit is again started in XI Five Year Plan in the year 2009. Black Bengal is the only recognized breed of goat found in Jharkhand. A total of 29 buck (on the basis if growth and multiple birth) were selected from three different centers and distributed among the farmers for breeding and improvement purposes. The selected bucks have been exchanged from one centre to others to avoid inbreeding.

Flock Statistics

Table 6.1: Flock Statistics of Black Bengal Goats at Different Centres (01.04.2013 to 31.03.2014)

Centres	Male	Female
0 – 3 M	154	147
3 – 6 M	144	263
6 – 12 M	267	462
Adult	105	1042
Total	**670**	**1914**

Center/ Year	Initial strength(A)	No. of Kid born (B)	Total (A+B)=C	No of Kid died/Sale	Population growth (%)=(C-D-A) A×100
Beko					
2010-2011	453	223	676	103	26.49
2011-2012	449	210	659	66	32.071
2012-2013	596	447	1043	250	33.05
2013-2014	704	523	1227	73	63.92
Palajori					
2010-2011	342	192	534	69	35.96
2011-2012	425	190	615	69	28.47
2012-2013	555	418	973	283	24.32
2013-2014	778	546	1324	81	59.76
Chamguru					
2012-2013	308	130	438	55	24.35
2013-2014	648	1324	1120	68	62.34
Teko					
2013-2014	454	81	690	36	44.05

Body Weight

The overall means of body weights recorded at birth, 3, 6, 9 and 12th month of age were 1.21±0.03, 5.86±0.04, 8.90±0.06, 11.22±0.07 and 13.40±0.08 kg, respectively. Significant effect of sex was observed on body weights at all stage except birth weight in Black Bengal kids. Seasons of birth were significant effect on body weights at all stages. Kids born during winter season were significantly heavier (1.25±0.03 kg) at birth than those born during summer (1.19±0.04 kg) and mansoon (1.16±0.04 kg). This could be probably due to availability of better quality of green fodder during post monsoon and winter season to does in gestation as majority of winter kidding occurred in the month of February (Table 6.2).

Table 6.2: Body weight at different stage of growth (2013-14)

Effects	Least Square Means ± SE				
	Birth	3-Month	6-Month	9-Month	12-Month
Overall (μ)	1.21±0.03 (1224)	5.86±0.04 (1188)	8.90±0.06 (1006)	11.22±0.07 (926)	13.40±0.08 (652)
Sex					
Male	1.24±0.05 (618)	6.69±0.04[a] (602)	9.90±0..05[a] (402)	12.06±0.09[a] (342)	14.74±0.12[a] (180)
Female	1.19±0.03 (606)	5.11±0.06[b] (586)	8.04±0.08[b] (604)	10.63±0.06[b] (584)	12.24±0.06[b] (472)
Type of kidding					
Single	1.33±0.03[a] (260)	6.64±0.05[a] (248)	10.38±0.06[a] (218)	12.56±0.06[a] (206)	15.02±0.08[a] (138)

	Birth	3 Month	6 Month	9 Month	12 Month
Twin	1.21±0.02[ab] (913)	5.87±0.04[a] (894)	8.47±0.04[ab] (749)	11.32±0.05[ab] (688)	13.65±0.06[ab] (486)
triplet	1.09±0.05[b] (51)	5.11±0.07[b] (46)	8.06±0.08[b] (39)	10.07±0.08[b] (32)	11.74±0.10[b] (28)
Quadruplets	1.33±0.03[a] (260)	6.64±0.05[a] (248)	10.38±0.06[a] (218)	12.56±0.06[a] (206)	15.02±0.08[a] (138)

Table 6.2: Body weight (kg) of kids at various stages of growth at different centers

Center/Year	Birth	3 Month	6 Month	9 Month	12 Month
Beko					
2010-2011	0.97±0.04	4.65±0.30	7.69±0.41	8.53±0.70	13.12±0.56
2011-2012	1.2±0.05	5.2±0.51	8.25±0.45	10.29±0.63	11.64±0.64
2012-2013	1.21±0.03	5.78±0.06	8.45±0.06	10.63±0.06	12.72±0.07
2013-2014	1.24±0.04	5.68±0.05	8.65±0.054	11.43±0.06	13.72±0.04
Palajori					
2010-2011	0.97±0.08	4.55±0.30	6.79±0.61	8.43±0.50	12.02±0.56
2011-2012	1.17±0.30	5.27±0.60	8±0.74	10.16±0.60	11.29±0.63
2012-2013	1.20±0.04	5.22±0.60	8.21±0.70	10.28±0.07	12.14±0.09
2013-2014	1.30±0.45	5.92±0.03	8.51±0.60	11.48±0.04	13.24±0.06
Chamguru					
2010-2011	0.97±0.08	4.55±0.30	6.79±0.61	8.43±0.50	12.02±0.56
2011-2012	1.07±0.04	4.95±0.35	7.69±0.33	8.10±0.42	12.06±0.48
2012-2013	1.19±0.03	5.11±0.07	8.04±0.080	10.09±0.08	11.85±0.12
2013-2014	1.23±0.02	6.21±0.03	8.64±0.053	11.25±0.50	13.55±0.42
Teko					
2013-2014	1.20±0.03	6.25±0.04	8.74±0.05	11.55±0.450	13.15±0.35

Reproduction

The reproductive performance of Black Bengal goats is shown in Table 6.3. The overall reproductive parameters of Black Bengal goats viz. age at first mating, body weight at first mating, age at first kidding, weight at first kidding, service period, kidding interval and gestation period were 270.43 ± 1.84 days, 10.48 ± 0.64 kg, 420.92 ± 1.19 days, 11.58 ± 0.35 kg, 68.21 ± 2.06 days, 217.72 ±2.41 days and 146.27 ± 0.81 days , respectively.

Table 6.3: Reproductive Parameters of Black Bengal Goats (2013-14)

S No.	Traits	Mean ± SE			
		Beko	Palajori	Ranchi	Overall
1.	Age at first mating (days)	259.32 ± 1.33 (661)	276.15 ± 1.69 (122)	271.10±2.31 (113)	270.43± 1.84 (407)
2.	Body weight at first mating (kg)	11.22 ± 0.44 (661)	11.06 ± 0.68 (119)	10.23 ± 0.70 (107)	10.48 ± 0.64 (364)
3.	Age at first kidding (days)	408.11 ± 1.06 (562)	426.58 ± 1.05 (117)	418.22±1.36 (102)	420.92± 1.19 (351)
4.	Weight at first kidding (kg)	13.22 ± 0.21 (549)	11.29± 0.41 (123)	11.44 ± 0.36 (98)	11.58 ± 0.35 (351)
5.	Service period (days)	65.44 ± 1.14 (523)	66.51 ± 2.33 (110)	67.82 ± 1.81 (106)	68.21 ± 2.06 (340)
6.	Kidding interval (days)	215.45±1.44 (457)	222.12 ± 1.38 (114)	217.71±1.40 (100)	217.72 ±2.41 (337)
7.	Gestation period (days)	145.33 ± 1.14 (657)	148.16 ± 0.82 (139)	144.42±0.91 (118)	146.27± 0.81 (438)

Distribution of Bucks

A total of 29 buck (on the basis of growth and multiple birth) were selected from three different centres and distributed among the farmers for breeding and improvement purposes. The selected bucks have been exchanged from one centre to others to avoid inbreeding. The selection differential for body weight at 9 month of age was 4.02 kg (Table 6.4).

Table 6.4: Selection differential of selected males at 9 Month of age (2013-14)

Parameter	Mean ± S.E. (kg)
Selected males	16.26± 0.14
Population mean	12.06 ± 0.09
Selection differential	**4.02**

Disease Prevalence

Health management of Black Bengal goats in the form of prophylactic and curative measure was provided to the animals in selected villages of Jamshedpur, Deoghar and Ranchi districts. The detail of prophylactic treatments has been summarized in Table 6.5.

Table 6.5: Prophylactic Measures in Black Bengal Goats

Sl. No.	Prophylactic measures	Number of Animals
1.	Deworming	3866
2.	Dipping	2510
	Vaccination	
3.	PPR	3244
4.	ET	3206
5.	Goat Pox	644

Human Resource Development

A training programme on scientific goat husbandry was organized on 19-21 November, 2013 at Instructional Small Ruminant Farm, Ranchi Veterinary College. 26 farmers from all three centres participated in the training programme. In this two days training programme farmers were educated for scientific breeding, feeding and management aspects. They are also being trained for first aid para-vet aspect to take care of their animals.

6.4   Gaps/constraints/shortfalls/excess and reasons thereof, if any
Nil

6.5   PC's evaluation: Very Good (A) Good (B) poor (C)
——————————————Very Good (A) ————————

6.6   Future programme identifying the activities, timeline and targets for each of the activity
Performance recoding will be carried out at four clusters established at Deoghar, East Singhbhum, Ranchi and Lohardaga districts.

6.7   Remarks
The unit has been doing good work in tribal area in Jharkhand state.

7. Gaddi Field Unit, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, Himachal Pradesh

7.1   Principal Investigator

Dr. P. K. Dogra Professor (AG&B)

7.2   Activity assigned and targets fixed for each activity during the period

Since, the Unit is actively engaged in brining upon improvement in farmers flock of Gaddi breed, following activities were assigned to the unit along with implementation of technical programme.

i.   Identification, selection and rearing of approximately 50 kids for future buck production. The selection of male kids should based on type of birth and weaning weight.

ii.   Distribution of superior bucks amongst farmers of adopted villages and also to the goat farmers of the state for genetic improvement purpose.

iii.   Follow-up action plan for performance re-cording when goats are on migration to high altitudes.

iv.   Organization of animal health, vaccination and deworming camps, trainings to the farmer in the field units.

v.   Development and execution of a health and fodder calendar.

vi.   Documentation on Impact of the project, production and economic status of farmers.

7.3 Activity carried out during the period

The unit is based in Himalayas region and working on migratory flock. It is difficult to follow goats in high hill terrains. The Unit has being doing performance recording and genetic improvement work in farmers flock. The detailed work is as under.

1.   Four field units comprising of 1149 goats including 749 breedable does belonging to four different migratory routes were monitored. All the animals were identified by ear tagging.

2.   A total of 625 young kids were added in selected flocks by way of birth, 118 animals of different age groups died and 459 animals pertaining to different age groups were sold by the owners.

3.   A total of 30 male kids of 4-6 months age group were purchased from these units after primary selection on the basis of morphological characteristics and better/ higher growth rates. These male kids were then transferred to Palampur center for subsequent rearing up to the age of sexual maturity, following all standard management practices. After final selec-tion, a total of 17 males were finally distributed to 15 different farmers as a breeding input.

4.   The observed twinning percentage in Gaddi goats was 19.96 % and this trait is being taken care while selecting the male kids for further buck rearing.

5.   All selected animals were provided health coverage under migratory field conditions viz. vaccination against PPR (200 doses), de-worming (900 animals) against endo-parasites after fecal sample analysis, periodic health checkups etc.

6.   Strategic supplementary feeding was also provided in the form of mineral mixture (344 Kg) and concentrate feed (49 qtls.) supply.

7.   Collaboration with state Animal Husbandry Department was ensured while providing health coverage and other related activities.

Detailed Achievements

All India Coordinated Research Project on Goat Improvement on Gaddi Field Unit is located at HPKV, Palampur (HP). It was sanctioned on 17th February 2009, but the actual work

could start only with the recruitment of project staff w.e.f.. January 2010. The survey results showed that breeding tract of Gaddi goats is distributed mainly in the pockets of Mandi, Kullu, Kangra and Chamba districts. The average family size was 5.82 and land holdings 8.88 bigha per family. The farmers followed very primitive health practices for their flock and about 62.19 per cent of the farmers had the awareness about signs of most commonly occurring diseases.

The flock statistics of Gaddi goats under different field units during the period 2013-14 have been presented in Table 7.1. The opening balance of the flock as on 01.04.2013 was 1149 comprising of 749 breedable does and 7 bucks, 5 male growers and 210 female kids below 1 years of age. A total of 625 young kids (273 male and 352 female) were added by way of birth, 118 animals of different age groups (22 male and 96 female) died and 459 animals (252 male and 207 female) pertaining to different age groups were sold. Out of the available male progeny 30 animals in the age group of 3-4 months, on the basis of better growth rate, were put to primary selection and purchased from the selected flocks. They were then transferred to head quarter at COVAS, Palampur and reared up to the age of sexual maturity following standard practices under semi-intensive system of management. After attaining the age of sexual maturity, a total of 17 (seventy) males were finally selected on the basis of body weights and breed characteristics and distributed to the farmers as breeding bucks. The closing balance as on 31.03.2014 was 1197 animals under different age groups.

Table 7.1: Flock Statistics of Gaddi Goats

Year/ Characteristics	2011-12	2012-13	2013-14	Total
Adult Does Kidded (No.)	414	482	521	1417
Number of Kids Born	480	598	625	1703
Total Strength (No.)	894	1080	1146	3120
Number of kids died	52	55	72	179
Population Growth (%)	103.38	112.66	106.14	107.55
No. of Twin Birth	82	115	104	301
Percent of Twin Birth	19.81	23.86	19.96	21.24
No. of abortions/ still births	31	45	35	111
Percent of abortions/ still births	7.49	9.34	6.71	7.83

Body Weight

The least square means of body weights at different ages (Kg) in Gaddi goats during the period 2013-14 are presented in table 7.2. The data were analyzed using SAS software with GLM procedure. The overall least square mean for body weights at birth, 3, 6, 9 and 12 months of age were 2.98±0.02, 15.03±0.13, 19.17±0.17, 23.57±0.12 and 26.80±0.18 Kg., respectively. Significant effects of sex of kid and field units were observed. Significant differences between different field units were also observed due to different migratory locations and availability of nutrients through grazing (2.98, 2.82, 2.96 and 3.01Kg for birth weight; 15.02, 14.85, 15.17 and 14.89 Kg for three month weight, 18.86, 19.95, 19.05 and 19.41 Kg for six month weight, 23.14, 24.13, 23.92 and 23.54 Kg for nine month weight and 26.99, 26.89, 26.20 and 27.06 Kg for twelve months weight under field units I, II III and IV, respectively.

Table 7.2: Least Square Means of body weights at different ages (kg) in Gaddi goats

Factor	Weight (Kg)				
	Birth	3 Month	6Month	9Month	12month
Overall Mean	2.88±0.02 (535)	14.94±0.31 (622)	18.95±0.18 (433)	22.80±0.21 (433)	26.80±0.21 (532)
Years					
2011-12	2.70±0.02 (158)	14.91±0.39 (178)	18.18±0.21 (118)	21.16±0.34 (142)	26.21±0.23 (150)
2012-13	2.91±0.03 (171)	14.88±0.13 (235)	19.32±0.20 (142)	23.65±0.16 (128)	27.32±0.23 (169)
2013-14	2.98±0.02 (206)	15.03±0.13 (209)	19.17±0.17 (173)	23.57±0.12 (163)	26.80±0.18 (213)

| Factor | Weight (kg) | | | | |
	Birth	3 Month	6 Month	9 Month	12 Month
Overall Mean	2.98±0.02 (206)	15.03±0.13 (209)	19.17±0.17 (173)	23.57±0.12 (163)	26.80±0.18 (213)
Sex					
Male	3.22±0.03[a] (79)	15.42±0.19[a] (93)	20.47±0.38a (34)	24.68±0.33[a] (21)	30.43±0.48[a] (21)
Female	2.82±0.02[b] (127)	14.71±0.17[b] (116)	18.84±0.18[b] (139)	23.41±0.12[b] (142)	26.29±0.16[b] (192)
Units					
I	2.99±0.04[a] (73)	15.02±0.23[a] (65)	18.86±0.28[a] (69)	23.14±0.20[b] (56)	26.99±0.31[a] (77)
II	2.82±0.07[ab] (43)	14.85±0.41[a] (64)	19.95±0.53[a] (39)	24.13±0.39[a] (51)	26.89±0.63[a] (55)
III	2.96±0.05[a] (67)	15.17±0.23[a] (59)	19.05±0.37[a] (46)	23.92±0.21[ab] (41)	26.20±0.36[a] (63)
IV	3.01±0.04[b] (23)	14.89±0.25[a] (21)	19.41±0.34[a] (19)	23.54±0.24[a] (15)	27.06±0.34[a] (18)

Reproduction

The population growth (%) and reproductive performance in Gaddi goats during the period 2013-14 has been shown in table 7.3. The perusal of table indicates that out of 625 kids born, 72 died due to various causes representing an overall population growth of 106.14%. Number of twin births recorded was 104 (19.96%) and 35 cases of abortions/ still births (6.71 %) were also observed. The means for reproductive performance were calculated from different observations as given below in the Table 7.3.

Table 7.3: Reproductive Performance of the Gaddi goats (2013-14)

Parameter	Unit-I	Unit- II	Unit- III	Unit-IV	Total
Adult Does Kidded (No.)	156	138	189	38	521
Number of Kids Born	191	170	218	46	625
Total Strength (No.)	347	303	407	84	1146
Number of kids died	14	23	26	9	72
Population Growth (%)	113	106	101	97	106
No. of Twin Birth	35	32	29	8	104
Percent of Twin Birth	22.44	23.19	15.34	21.05	19.96
No. of abortions/ still births	11	9	12	3	35
Percent of abortions/ still births	7.05	6.52	6.35	7.89	6.71

Health Management

The prophylactic treatment and strategic input distribution to the animals under different field units during the period under report has been given in Table 7.4. All the animals were vaccinated against PPR, provided dipping bath to eradicate ecto-parasites and de-worming against endo-parasites after faecal sample examination. Periodic health checks ups were arranged in which treatment of sick animals was done and medicines were provided. Under strategic input distribution a special mineral mixture for sheep and goats (developed by department of Animal Nutrition, COVAS, CSKHPKV, Palampur) and concentrate feed was provided.

Table 7.4: Prophylactic treatment and strategic input distribution to the animals under different field units (2013-14)

Sr. No.	Prophylactic Measures	Number of Animals/ Quantity
1.	Deworming	900 animals
2.	Dipping	900 animals
3.	Vaccination PPR	200 animals
4.	Mineral mixture	349 kg
5.	Feed for goats	49 quintals
6.	Other treatment	450 animals

Biometric Measurements of Gaddi Goats at Different Age Groups

The biometric measurements of Gaddi goats at different age groups during the period under report are given in table 7.5. The overall body length, body height and body girth at birth was 31.88, 34.38 and 36.50 cm, respectively. The corresponding figures at three month were 52.84, 51.86 and 56.22 cm, at six months were 60.12, 57.84 and 63.58 cm, at nine months were 62.40, 61.99 and 64.71 cm and at twelve months were 66.48, 65.25 and 74.27 cm, respectively.

Table 7.5: Biometric Measurements of Gaddi at Different Age Groups

Sex	Traits	Birth	3 Month	6 Month	9Month	12month
Male	BL(cm)	32.06±0.13 (69)	54.09±0.33 (99)	61.47±0.45 (29)	63.05±0.97 (18)	66.80±0.26 (17)
	BH(cm)	34.63±0.12 (69)	52.67±0.23 (99)	57.62±0.33 (29)	64.04±0.86 (18)	64.43±0.67 (17)
	BG(cm)	36.56±0.10 (69)	58.97±0.28 (99)	64.56±0.56 (29)	73.48±0.81 (18)	75.24±0.82 (17)
Female	BL(cm)	31.72±0.09 (102)	53.58±0.37 (136)	60.68±0.22 (113)	62.68±0.37 (110)	65.43±0.80 (152)
	BH(cm)	34.10±0.09 (102)	52.07±0.21 (136)	57.12± 0.33 (113)	60.39±0.33 (110)	63.16±0.22 (152)
	BG(cm)	36.36±0.08 (102)	57.57±0.32 (136)	63.79±0.28 (113)	72.66±0.31 (110)	75.17±0.27 (152)
Overall	BL(cm)	31.85±0.08 (171)	52.87±0.25 (235)	60.84±0.20 (142)	62.73±0.35 (128)	66.77±0.25 (169)
	BH(cm)	34.31±0.07 (171)	52.33±0.16 (235)	57.21±0.15 (142)	60.87±0.32 (128)	63.29±0.21 (169)
	BG(cm)	36.44±0.06 (171)	58.34±0.22 (235)	65.55 ±0.25 (142)	72.76±0.29 (128)	75.17±0.26 (169)

7.4   Gaps/constraints/shortfalls/excess and reasons thereof, if any

·   Poor economic status of the farmers / traditional goat breeders.
·   Lack of protection of flocks from wild animals.
·   Unorganized meat market and low prices of meat.
·   No organized government farm for goats in the state to provide consultancy and quality bucks.
·   Inbreeding in farmer's flock.
·   Prevalence of toxic plants/ grasses in the pasture.
·   Decrease in the pasture areas due to weed infestation.
·   Less incentives to the goat rearers as compare to other sectors.

7.5   PC's evaluation: very good (A) Good (B) poor (C)

—————————————Good (B) ——————————————

7.6   Future programme identifying the activities, timeline and targets for each of the activity

Since, the Unit is actively engaged in brining upon improvement in farmers flock of Gaddi breed, following activities are to be done priority basis.

vii.   Identification, selection and rearing of approximately 50 kids for future buck production. The selection of male kids should based on type of birth and weaning weight.

viii.   Distribution of superior bucks amongst farmers of adopted villages and also to the goat farmers of the state for genetic improvement purpose.

ix.   Follow-up action plan for performance recording when goats are on migration to high altitudes.

x.   Organization of animal health, vaccination and deworming camps, trainings to the farmer in the field units.

xi.   Development and execution of a health and fodder calendar.

xii.   Documentation on Impact of the project, production and economic status of farmers.

7.7   Remarks

This unit has been doing good work and has been able to show some positive impact in farmers flock especially on health, and body weight growth. The Unit may evolve procedure and abilities to record the performance when goats migrate to high hill terrains.

8. Ganjam Field Unit, Orissa University of Agriculture & Technology, Bhubaneswar, Odisha

8.1   Principal Investigator
Dr. D.K. Karna, Senior Scientist (AG&B)

8.2   Activity assigned and targets fixed for each activity during the period

The Ganjam goats remains in the field all the times. The unit has been given responsibility to improve the production and productivity of Ganjam goats. For this field data recording of on growth, reproduction, health and selection of superior bucks and implementation of technologies were main work assigned on to this Unit.

· Performance recording on at least 600 breedable does under the coverage.

· Selection of superior males at 9 month age and distribution to the registered farmers.

· Provision of health coverage to the all goats of project with collaboration of AH Dept.

8.3   Activity carried out during the period
As per technical programme of field units.

Detailed Achievements

The Ganjam field unit located at OUA&T, Bhuvaneshwar had three village centres identified in different blocks of Ganjam district where the concentration of animals were high and response of farmers is encouraging. A total of three new villages Bharasa, D. Guhariapat and K. Guhariapat in the Khallikote centre were adopted. Gola community mostly rears Ganjam goats. The goats are migrated from one place to another in search of browsing materials.

Flock Statistics

The flock statistics of Ganjam field unit has been presented in Table 8.1. The Ganjam field unit had a closing balance of goats at Chattarpur, Rambhaand Khallikote centres was 2003, 1197 and 1674, respectively in the year 2013-14. The opening balance of Ganjam goats including all the centres was 8510 and closing balance was 9748 at the end of year. A total number of 980 kids were born in Chhatrapur centre followed by 722 numbers of kids at Rambha centre and 757 kids in Khallikote centre during the reporting period i.e. 1 April 2012 to 31 March 2013. A total number of 936 kids were born in Chhatrapur centre followed by 722 numbers of kids at Rambha centre and 811 kids in Khallikote centre during the reporting period. The mortality in kids was 10.47 % during the reporting period. A total of 912 un-castrated males and 872 females were sold from the population during the year.

Table 8.1: Flock Statistics of Ganjam goats at different centres (2013–14)

Center	Sex	Opening Balance April 2013				Closing BalanceMarch 2014			
		0-3	3-12	Adult	Total	0-3	3-12	Adult	Total
Chhatrapur	M	76	269	95	440	62	229	96	387
	F	70	240	1545	1854	63	150	1403	1616
	T	146	509	1640	2294	125	379	1499	2003
Rambha	MFT	48	118	111	81	45	72	98	215
	F	54	111	1106	841	43	72	867	982
	T	102	229	1217	922	88	144	965	1197
Khallikote	M	72	203	90	365	69	160	73	302
	F	73	196	1308	1577	58	128	1186	1372
	T	145	399	1398	1942	127	288	1259	1674

Body Weight

The least squares means for growth and body weight has been presented in Table 8.2. The overall least squares means of body weight at birth 3, 6, 9 and 12 month of age were 2.41 ± 0.02kg, 7.48 ± 0.05 kg, 9.90 ± 0.07kg, 14.49 ± 0.06 kg and 18.38 ± 0.07 kg, respectively. Males were found to be significantly heavier than female counterparts at all stages of growth. The effect of season of birth was found to be non-significant on the body weights at different ages. There has been considerable improvement in body weights at 9 and 12 months age in elite group. There was a significant increase of the body weight at 9 and 12 months of age in comparison of base population average.

Table 8.2: Least squares means for body weight (kg) in Ganjam goats

Year	Age group				
	Birth	3 Month	6 Month	9 Month	12 Month
Overall Centres	2.41 ± 0.02	7.48 ± 0.05	9.90 ± 0.07	14.49 ± 0.06	18.38 ± 0.07
Chhatrapur	2.66 ± 0.04	7.16 ± 0.08	10.22 ± 0.10	14.46 ± 0.09	18.40 ± 0.12
Rambha	2.31 ± 0.04	7.47 ± 0.09	9.91 ± 0.16	14.58 ± 0.10	18.23 ± 0.13
Khallikote	2.25 ± 0.04	7.80 ± 0.10	9.58 ± 0.12	14.40 ± 0.11	18.51 ± 0.13

Milk Production

The average daily milk yield of Ganjam goats was 425.5 ± 10.8 ml.

Reproduction

The reproductive performance has been presented in Table 8.3 and has been calculated on the basis of does available for breeding purpose. A total number of 3757 does were available for breeding during the years 2013-14 at different village centers out of which 2262 kidded. The kidding percentage of Ganjam goat was 60.02. This breed produced only single kids (2455) and there were 4 twins born in 2013-14.

Table 8.3: Reproductive performance of Ganjam goats

Parameters	2010-11	2011-12	2012-13	2013-14
No. of does available for breeding	3502	3683	3779	3757
No of does conceived	2377	2465	2480	2301
No. of does kidded	2342	2424	2459	2262
No. of kids - Male	1169	1212	1219	1136
- Female	1173	1212	1240	1126
Type of birth (Single)	2338	2424	2455	2262
Abortion	35	41	21	39
Kidding percentage	66.87	65.81	65.07	60.20

The age at first kidding, wt. at first kidding, and kidding interval were 602.6, 20.4 and 314.3 days, respectively (Table 8.4). It is observed that the time interval between age at first heat and age at first kidding is about 185 days in Ganjam goats. The service period of Ganjam goats is longer compared to other contemporaries reared in this region. It is observed that the kidding interval of the Ganjam goats was also significantly longer. The longer service period has resulted in longer kidding interval in Ganjam goats.

Table 8.4: Reproductive Traits (Mean ±S.E.) of Ganjam goats

Parameters	2010-11	2011-12	2012-13	2013-14
Age at first heat(day)	433.7±3.6	431.6±4.2	406.7±7.4	417.2±8.7
Age at first kidding (day)	624.2±3.9	619.3±4.0	611.4±6.3	602.6±7.8
Weight at first kidding (kg)	21.90±0.1	22.1±0.24	21.8±0.34	20.4±0.4
Kidding interval (day)	319.7±3.9	317.9±4.6	302.8±8.2	314.3±10.5

Health Management

Prophylactic measures were undertaken in the farmer's flock. A total number of 10112 goats were dewormed and 5500 goats were vaccinated against FMD. A total number of 2312 goats were treated for different diseases in the project area by this field unit in the year 2013-14. The mortality percent in newborn kids was 10.47% under field conditions.

Socio-economic Profile

Ganjam goats are exclusively reared by Gola Community since generations. Study of socio-economic analysis indicated that most of the goat keepers (50%) had education up to upper secondary level. The average annual income of goat keepers was Rs. 45000 out of which 67% income were from goat rearing occupation (Table 8.5) during the year 2013-14.

Table 8.5: Socio-economic profile of goat farmers in Ganjam district

Parameters	2009-10	2010-11	2011-12	2013-14
No. of villages	7	4	4	10
No. of farm families	42	42	40	53
No. of goats per farmer	70.86	87.14	—	3.84
Land holding	0.8	1.75	1.46	1.41
No. of family members	5.48	7.07	8.38	7.68
(a) Below primary (%)	32.61	77.7	72.0	72.5
(b) Up to UP (%)	53.04	15.4	26.6	23.52
(c) Above UP (%)	14.35	6.9	1.4	3.9
Av. Annual Income (Rs)	30,000	>36000	>38.000	>45,000
Av. Income from goat (%)	70.00	>60.00	>66.00	>67

8.4 Gaps/constraints/shortfalls/excess and reasons thereof, if any

The unit is working on a breed which remains in migration for about 6 months therefore pedigree and performance recording is a problem.

8.5 PC's evaluation: very good (A) Good (B) poor (C).

─────────────Good (B)─────────────-

8.6   Future programme identifying the activities, timeline and targets for each of the activity

The Unit has to post qualified staff to the project area and implement the technical programme properly. The animal identification is to be done on priority. About 100 male kids are to be identified on the basis of type of birth and weaning weight and selected as future bucks for improvement of breed.

8.7   Remarks

The flock size maintained by the farmers range from 50 to 250 and a group of four to five farmers mix their goats taking a population ranging from 500 to 1200 which remain in the field. Although, pedigree and performance recording is bit difficult but the unit has to make efforts to implement technical programme of the project properly.

9. Malabari Field Unit, Kerala Veterinary and Animal Sciences University, Directorate of Dairy Development, Pattom, Kerala

9.1 Principal Investigator

Dr. Thirupathy Venkatachalapathy Assistant Professor (AGB)

9.2 Objectives

As per approved SFC of the project

9.3 Activity assigned and targets fixed for each activity during the period

The main aim the unit was to improve goats in farmers field by implementing technical programme laid down for field units. Main job allocated was to

1. Purchase of male kids from farmers' flock.
2. Rearing the male kids till age of sexual maturity.
3. Distribution of bucks, breeding of flocks and recording of data.
4. Recording of performance on body weight and milk yield etc.
5. Collection of data on socio-economics and managemental practices.
6. Selection of male and females.
7. Collection information on marketing.
8. Establishment of co-operative/self-help groups.
9. Evaluation of role of women in goat rearing in the area.

Activity carried out during the period

As per the technical programme, elite male animals were distributed to farmers free of cost. A total of 69 bucks of Malabari breed selected on the basis of body weight and growth rate including 14 during the report period. Evaluations of bucks are done by contemporary comparison for body weight at below one, three, six and nine months of age in different field centres. Health measures like periodical deworming, providing feed supplements and vaccination were carried out. Analyzed morbidity and mortality patterns and prepared prophylactic annual health calendar for goat. The production economics is calculated and determined the efficiency of production. Standardizes techniques for the value addition of goat milk by developing different milk products like paneer, peda, gulabjamun, Kalakand and whey melon. Distribution of goat keepers according to their education level, land holding, family size and flock size was done. Extension classes offered to 530 farmers, 88 students and 40 member tribal groups.

Flock Statistics

The flock strength of registered animals under field unit was 2076 including 1289 adult female goats as on 31 March, 2014. Out of this, 1075 adult does were newly registered in to various centres due to high rate of sale of animals. During the year 2013-14, addition due to birth was 843 while reduction due to death and sale of animals were 68 and 1379 respectively (Table 9.1).

Table 9.1: Flock Statistics of Malabari Goats during the period 2013-14

Traits	Opening Balance(01-4-2013)		Closing Balance(31.03.2014)	
Age	M	F	M	F
0-3	219	160	231	177
3-6	100	76	98	118
6-9	36	50	38	41
9-12	14	33	12	36
ADULT	41	160	36	1289
Total	410	479	415	1661
G. Total	**889**	**2076**		

Body Weights/ Growth

The overall mean body weight recorded at below one, three, six, nine and twelve months of age were 3.12 ± 0.06, 8.60 ± 0.13, 14.50 ± 0.27, 19.20 ± 0.48 and 21.80 ± 0.87kg respectively. Centre and year of birth had significant effect on body weights at all age groups. Males were heavier over females. The effect of type of birth was insignificant at one, six, nine and twelve months of age. The mean body weight gains at different stages of growth are presented in the Table 4. The overall growth rate ranged from 53.17 g to 61.94g per day and highest growth rate observed between first and third month of age (Table 9.2).

Table 9.2: LSM of Body Weights (Kg) At Different Ages

Factor	Weight at				
	Below one month(kg)	Three month(kg)	Six month(kg)	Nine month(kg)	Twelve month(kg)
Overall mean	3.15±0.06	8.60±0.13	14.50±0.27	19.20±0.48	21.80±0.87
Centre					
Thalassery	3.20±0.06	8.70±0.15	14.80±0.27	19.80±0.45	22.20±0.80
Tanur	2.80±0.07	7.50±0.14	13.70±0.29	18.30±0.50	21.20±0.80
Badagara	3.40±0.10	9.80±0.20	17.20±0.37	22.75±0.60	23.75±1.10
Perambra	3.10±0.09	8.10±0.22	13.60±0.35	18.10±0.65	20.80±1.13
Thaliparambu	3.02±0.08	8.80±0.25	15.30±0.34	19.40±0.60	20.90±1.10
Kottakkal	3.40±0.10	9.45±0.23	17.10±0.40	22.70±0.60	24.10±1.08
Sex					
Male	3.25±0.07	8.80±0.20	14.90±0.30	19.60±0.55	22.80±0.92
Female	3.15±0.07	8.20±0.17	14.10±0.28	19.00±0.52	21.30±0.80
Type					
Single	3.20±0.05	8.60±0.10	14.60±0.15	18.70±0.25	22.80±0.50
Twin	3.10±0.05	8.40±0.10	14.10±0.12	18.60±0.20	22.50±0.60
Year					
2009-10	2.79±0.07	7.62±0.16	13.02±0.27	17.51±0.54	19.23±0.98
2010-11	2.90±0.07	8.14±0.17	14.00±0.28	18.81±0.53	20.23±0.87
2011-12	3.22±0.07	8.24±0.18	14.02±0.30	18.69±0.60	21.43±1.13
2012-13	3.30±0.09	8.36±0.20	14.13±0.29	18.78±0.62	21.72±1.15
2013-14	3.15±0.06	8.60±0.13	14.50±0.27	19.20±0.48	21.80±0.87

Milk yield

The overall mean average daily milk yield was 0.85 ± 0.05 litres with lactation length of 85 ± 10.50. Peak yield recorded were 2.20 litre. The lactation performance of Malabari goats for average daily milk yield is shown in Table 9.3.

Table 9.3: Mean Daily Milk Yield

Parametre	Average daily milk yield (lit)
Overall mean	0.85±0.05
Peak yield recorded	2.20±0.20
Lactation length (days)	90±10.50

Reproductive Performance

The overall mean of age at first service and age at first kidding are 256.15±12.04 and 398.03±12.61 days respectively. The overall mean gestation length and inter kidding interval were 149.65±0.27 and 275.81±12.68 days respectively. The mean age at first service and age at first kidding were 256.20±12.10 and 398.10±12.50 days respectively. The overall mean gestation length and inter kidding interval were 149.80±0.30 and 276.80±13.80 days respectively (Table 9.4). Among the total 1169 does registered,503 does kidded. Kidding percentage on the basis of does kidded was 167.60. Average litter size was 1.68 during the 2013-14. Average litter size was 1.68 during the 2013-14. The percentage of singles, twins, triplets and quadruplets were 40.15, 52.52, 6.95 and 0.40 respectively in the total population under study during the period (Table 9.5).

Table 9.4: Means of Reproductive Traits at Different Centres

Traits	Thalassery	Tanur	Badagara	Kottakal	Overall
Age at first service (days)	270.40±16.40	244.20±14.60	262.50±19.10	244.30±22.20	256.20±12.10
Age at first kidding(days)	390.20±12.50	384.40±14.60	393.50±13.60	379.50±18.20	398.10±12.50
Gestation length (days)	150.10±0.02	149.20±0.40	149.50±0.50	150.20±0.60	149.80±0.30
Inter kidding interval (days)	297.20±15.60	234.50±21.10	253.50±26.60	241.30±26.80	276.80±13.80

Table 9.5. Reproduction and Breeding Efficiency of Malabari Goats

Sl. No	Parameters	2013-14
1.	Number of does registered (A)	1169
2	Number does kidded (B)	503
3.	Total no. of kidding	503
	Singles (C)	202x1= 202
	Twins (D)	264x2=528
	Triplets (E)	35x3=105
	Quadruplet(F)	2x4=8
	Stillbirth (G)	9
	Abortions (H)	7
	Actual live birth(I)	843
4.	Kidding percentage on the basis of does kidded (Ix100/B)	167.60
5.	Kidding rate (litter size)	1.68

Distribution of Elite Bucks

As per the technical programme, elite male animals were distributed to farmers free of cost. A total of 69 bucks of Malabari breed including 14 during the report period were selected on the basis of body weight and growth rate from the home tract and distributed to various field centres. The nine months body weight of selected bucks ranged from 18.8 to 24 kg with a mean of 22.4±1.20 kg. All the bucks were selected from the multiple births.

Sire Evaluation

A comparison of the performance of progenies with contemporaries for body weight at below one, three, six and nine months of age in different field centres are presented in Table 9.6. The progenies had a higher body weight at three, six and nine month age than contemporaries in all centers. Progenies recorded better body weight at first month in Thavanur and Thalipparambu. At nine months of age progenies had a body weight of 19.80±0.45, 18.30±0.50, 22.75±0.60, 18.10±0.65, 19.40±0.60kg and 22.70±0.60kg respectively in Thalassery, Tanur, Badagara, Perambra,Thaliparambuand Kottakkal. The average values for the contemporaries were 18.90±0.20, 17.20±0.50, 21.20±0.55, 17.50±0.80, 18.35±0.60kg and 18.30±0.22 respectively.

Table 9.6: Comparison of Progenies with Contemporaries

Centre	Groups	Body weight at			
		Below one	Three	Six	Nine
Thalassery	Progeny	3.20±0.06	8.70±0.15	14.80±0.27	19.80±0.45
	Contemporaries	2.90±0.10	8.50±0.10	14.20±0.15	18.90±0.30
Tanur	Progeny	2.80±0.07	7.50±0.14	13.70±0.29	18.30±0.50
	Contemporaries	2.60±0.10	6.85±0.20	12.60±0.30	17.20±0.50
Badagara	Progeny	3.40±0.10	9.80±0.20	17.20±0.37	22.75±0.60
	Contemporaries	3.10±0.10	8.80±0.22	16.50±0.40	21.20±0.55
Perambra	Progeny	3.10±0.09	8.10±0.22	13.60±0.35	18.10±0.65
	Contemporaries	2.60±0.06	8.10±0.20	12.80±0.22	17.50±0.80
Thaliparambu	Progeny	3.02±0.08	8.80±0.25	15.30±0.34	19.40±0.60
	Contemporaries	2.90±0.15	8.70±0.30	14.80±0.40	18.35±0.60
Kottakal	Progeny	3.40±0.10	9.45±0.23	17.10±0.40	22.70±0.60
	Contemporaries	2.90±0.09	8.70±0.12	15.60±0.14	18.30±0.22

Socio-economic Status of Goat Keepers

Socio economic status of goat keepers like education level, land holding, family size and flock size are determined. Majority of goat keepers (93.10%) in the project area had only school level education. Average land holding and family size were 24.20 cents and 4.30 respectively. About 11.80 per cent goat keepers were rearing only one adult goat and its kids. Average flock size was only 3.60 per cent of goat keepers rearing cattle was only 5.20. Among this most of them reared 1-2 cattle (58.30 per cent). Out of the total number of farmers registered, 63.67 per cent were women farmers indicating women empowerment in the sector.

Morbidity and Mortality pattern

The morbidity and mortality pattern Malabari goats under field is presented in the table 9.7 and 9.8.

Table 9.7: Morbidity Pattern

S.No	Diseases	No of animals affected	Percentage
1	Enteritis	59	36.66
2	Pneumonia	39	24.22
3	Coccidiosis	21	13.04
4	Acidosis	18	11.18
5	Tympany	13	8.07
6	Polyenceplomyelitis	11	6.83
	Total	**161**	

Table 9.8: Mortality pattern

Causes of mortality	Age in months				Adult
	0 to 3	3 to 6	6 to 9	9 to 12	
Coccidiosis	2	6	2		
Colibacillosis	7				
Debility	1	1	2		
Enteritis	9	1		2	
Predation	1		3		
Pneumonia	6	3		3	2
Toxaemia	1	2	2		
Acidosis					1
Other	4	1	2	2	2
TOTAL	31	14	11	7	5
Percentages	**45.59**	**20.59**	**16.18**	**10.29**	**7.35**

9.4 Gaps/constraints/shortfalls/excess and reasons thereof, if any
—Nil—

9.5 PC's evaluation: very good (A) Good (B) poor (C)
——————— Very Good (A)—————-

9.6 Future programme identifying the activities, timeline and targets for each of the activity
i. Efforts should be made to adopt farmers with higher flock size.
ii. Identification, selection and rearing of approximately 50 kids for future buck production. The selection of male kids should based on type of birth and weaning weight.
iii. Distribution of superior bucks amongst farmers of adopted villages and also to the goat farmers of the state for genetic improvement purpose.
iv. Organization of animal health, vaccination and deworming camps, trainings to the farmer in the field units.
v. Development and execution of a health and fodder calendar.
vi. Documentation on Impact of the project, production and economic status of farmers.

9.7 Remarks
The Unit has shown significant improvement and may adopt new clusters in the home tract of the breed.

10. Marwari Field Unit, Rajasthan Univ. of Veterinary & Animal Sciences, Bikaner, Rajasthan

10.1 Principal Investigator

Dr. G. C. Gahlot, Professor (Animal Genetics and Breeding)

10.2 Activity assigned and targets fixed for each activity during the period

The Unit was assigned job to implement programme in Marwari Goats, record the pedigree and performance in framers flock, build capacity of farmers, select goats for future breeding, implement technologies as per technical programme, Collection of data on socio-economics and managemental practices and Evaluation of role of women in goat rearing in the area. Following were the work assigned to them for the year under report.

1. The Animal identification should continue in the field flocks.
2. Pedigree recording should be done to generate genetic parameters
3. Performance recording should be done on the basis of actual age and not on dentition pattern.

The Unit should implement the technical programme of the project in consultation with PC and select three new clusters in as many districts of area of evolution of the breed.

10.3 Activity carried out during the period

The performance recording on pedigree, growth, milk yield, reproduction, health etc. were carried out on each of 4 clusters adopted under the project. Prepared Annual Prophylactic Health Calendar suitable for the area. Necessary vaccination and health control measures were taken up. The Elite bucks were distributed to registered farmers. Selection of kinds were made on the basis of multiple birth and body weight.

Detailed Achievements

The Marwari unit located at RAJUV&AS, Bikaner had four village centres i.e. Deshnoke, Daiya, Kalyansar and Raisar. The work carried out at different centres has been documented in the report for the year 2013-14. Four centers are functioning at Deshnok, Daiya, Kalayansar and Raisar villages in Bikaner district. The new cluster in Kan Singh Ji Ki Sid with about 500 goats does in the Jodhapur district approximately 100 km away from the head quarter was adopted during this financial year. Thus the unit is now working in five clusters from distant corners of breeding tract so as to explore maximum genetic variation available in the breeding tract. In addition to these clusters, the Buck rearing/Germ plasm Center is also functioning at Livestock Research Center, Kodemdeshar for rearing of elite bucks for distribution to the farmers in the field unit area.

Flock Statistics

The flock statistics of Marwari field unit has been presented in Table 10.1. The opening balance as on 1-4-2013 was 3066 and closing balance was 2993 as on 1-4-2014. The overall population growth was 93.46 %. Highest numbers of goats were at Deshnoke centre followed by Kalyansar and Raiser.

Table 10.1: Flock statistics at different Centres (2012–13)

Units	Opening balance		Total addition		Total deduction		Closing balance		Total
	M	F	M	F	M	F	M	F	
Daiya									
0-3 M	48	84	155	111	140	214	19	25	44
3-12 M	138	236	92	130	184	236	92	130	222
Adults	22	281	12	105	23	120	10	266	276
Deshnoke									
0-3 M	115	155	272	283	469	594	25	25	50
3-12 M	35	299	272	283	270	299	37	283	320
Adults	35	826	14	122	23	293	26	655	681
Kalyansar									
0-3 M	76	44	208	121	189	136	49	29	78
3-12 M	59	407	159	92	123	81	159	92	251
Adults	25	410	20	72	31	153	14	329	343
Raisar									
0-3 M	28	26	120	126	45	69	53	45	98
3-12 M	86	91	67	81	84	56	67	81	148
Adults	10	207	15	52	15	13	10	246	256
Kan Singh jee Ki sid (Jodhpur District)									
0-3 M	-	-	-	-	-	-	10	16	26
3-12 M	-	-	-	-	-	-	15	19	34
Adults	-	-	-	-	-	-	1	165	166
Total	**702**	**3025**	**1386**	**1958**	**1449**	**1834**	**716**	**3036**	**3752**

Body Weight

Body weights for different stages of growth were recorded and are presented in Table 10.2. Body weights for different stages of growth were recorded and are presented in table 10.2. The body weight at different stages of growth at 3 month, 6 month, 9 month 12 month and more than 12 months were 8.47±0.13, 14.01±0.21 kg, 19.05±0.29, 26.18±0.40, and 32.74±0.64, respectively. The heritability of body weights ranged from 0.059±0.168 to 0.953±0.085 at different stages of growth. It was highest for the 3 months body weight (0.953±0.085) followed by 6 month (0.782±0.103) and 9 month (0.340±0.204) of age. The lowest heritability was observed for the adult group. The result indicates that selection of males and females will be done first at 3 months body weight and final selection will be done on 6 months body weight.

Table 10.2: Least squares means for body weight (kg) in Marwari goats

Year	Age group				
	Birth	3 M	6 M	9 M	12 M
2011-12	—	15.30±0.29 (74)	21.3±0.25 (26)	29.0±0.49 (113)	30.5±0.32 (65)
2012-13	2.65±0.02 (1534)	8.24±0.11 (591)	15.06±0.11 (561)	19.98±0.36 (53)	21.08±0.52 (25)
2013-14	—	8.47±0.13 (435)	14.01±0.21 (217)	19.05±0.29 (172)	26.18±0.40 (58)

Milk Production

The average milk yield was 41.29±0.59, 79.48± 1.99, 112.76±3.99, 140.09±6.71, and

163.01±5.46 liters, respectively at 30, 60, 90,120 and 150 days of lactation. The total milk yield was 143.91±3.29 lit in 89.24±2.05 days of lactation length. The milk yield per day of lactation length ranged from 0.81±0.031 to 1.32±0.024 (1.18±0.018) lit/day in Marwari goats under field condition (Table 10.3).

Table 10.3: Milk yield recorded (lit) in Marwari goats

Trait	2011-12	2011-12	2012-13	2013-2014
30 Days	49.33±2.70(695)	—	39.18±0.56(233)	41.29±0.59(529)
60 Days	—	—	75.55±1.09 (225)	79.48±1.99(529)
90 Days	104.74±1.47(155)	102.86±1.73(241)	105.26±1.99(145)	112.76±3.99(130)
120 Days	—	131.12±2.35(141)	135.21±2.45(92)	140.09±6.71(51)
150 Days	—	147.85±3.13(141)	149.33±5.09(34)	163.01(35)
Total Yield	—	107.85±3.13(241)	103.9±2.73(230)	143.91±3.29(529)
Lactation Length	—	106.38±1.21(241)	—	—

Reproduction

The average age at first service was 231.29±1.07 days which ranged from 221.10±0.81 to 238.80±1.07 days in different clusters of the field unit. The average age at first kidding was 383.29±1.07 day (373.10±0.81 to 39.80±1.07days) at different locations. The kidding interval ranged from 210.00±1.12 to 228.42±1.47 days (221.61±2.40 days). All the reproductive traits are significantly affected by location and different years indicative that management conditions were different over the years in different locations (Table 10.4). The overall kidding per cent was 93.19 %, incidence of abortions and stillbirths were 4.82 % and twinning percent was found to be 8.03 % (Table 11). This may be due to adaptation of scientific managemental practice by the goat breeder and proper care of animals during the prevalent famine conditions.

Table 10.4: Reproductive performances of Marwari goats

Class	Obs.	Age at firstService	Age at first kidding	Kidding Interval OBS.	Mean±SE
Overall	1077	268.19±1.04	418.72±1.03	786	203.67±4.22
Year of Kidding					
2011-12	90	271.83±2.29	421.90±2.27	39	158.32±11.82
2012-13	222	270.98±1.57	421.50±1.56	133	196.26±07.10
2013-14	107	231.29±1.07	383.29±1.07	28	221.61±2.40

Health Profile

Out of total 13,066 prophylactic measures, 4539 were for endo parasite, 5360 for ecto-parasite, 2677 for mineral deficiencies and 1765 for vaccination for the current year. On an average 11,318 goats every year were given prophylactic measures. The prophylaxis measures at different field units dear in both male and female goats are presented in the unit report.

10.4   Gaps/constraints/shortfalls/excess and reasons thereof, if any
——Nil——

10.5   PC's evaluation: very good (A) Good (B) poor (C)
——————————Good (B)——————-

10.6   Future programme identifying the activities, timeline and targets for each of the activity

1.   The Animal identification should continue in the field flocks.
2.   Pedigree recording should be done to generate genetic parameters
3.   Performance recording should be done on the basis of actual age and not on dentition pattern.
4.   The Unit should implement the technical programme of the project in consultation with PC and select three new clusters in as many districts of area of evolution of the breed.

10.7   Remarks

The Marwari Goats are one of the most adopted goats breeds of India in harsh hot climates. The number of pure goats of this breed may be one amongst top 3 (Bengal goats, Sirohi and Marwari). Therefore, this breed is of great significance to the nation. The Unit has to work hard for proper implementing the technical programme of the project.

11. Osmanabadi Field Unit, NARI, Phaltan, Maharashtra

11.1   Principal Investigator:
Dr. Chanda Nimbkar, Director, NARI, Phaltan

11.2   Activity assigned and targets fixed for each activity during the period

1)   The performance recording on growth, milk yield, reproduction, health etc. will be done separately for each group and reporting will be made accordingly.

2)   The unit will maintain at least 4 Centres having at least 600 breedable does under the coverage.

3)   Selection of males and females will be made on the basis of 6 month body weight in small breeds (Black Bengal) and 9 month body weight in medium and large breeds.

4)   Multiple birth born kids will be preferred over single born kids in the selection of future bucks.

5)   Semen bank will be established by the unit to store at least 1000 doses of semen of each elite buck available in the field area to promote ex-situ conservation of the breed and 500 semen doses to be sent to NBAGR, Karnal.

6)   The socio-economic studies will be undertaken and viability of goat rearing will be worked out.

7)   Strategic supplementary feeding schedule will be followed to improve the nutritional level of the goats.

8)   Health coverage will be provided to all the goats in the project area in collaboration with State Animal Husbandry Department.

9)   Marketing aspects of live goats and goat products viz. meat, milk, skin, hair and manure will be studied.

10)   Efforts will be made to form goat breeders' societies, cooperative societies and to register the goat flocks in the breeding tract of the respective breeds.

11.3   Activity carried out during the period

A new centre of the Osmanabadi Field Unit was started in July 2013 in Borla village (with about 130 goats) in Jamkhed taluka of Ahmednagar district, thus making the total number of centres four; Wadgaon in Satara district, Kamone in Solapur district and Sakat and Borla in Ahmednagar district. Total 723 adult does and their 1505 kids were recorded during 2013-14. There were 116, 297 and 310 adult female goats in Satara, Solapur and Ahmednagar districts respectively, belonging to 232 goat keepers. The average number of goats per household was thus 3.12. All goats and kids were protected with vaccination as per schedule and deworming and spraying as required. Milk yields of 400 does were recorded about 4 times during the lactation. The opening and closing balances of the number of recorded goats classified according to sex and age group are given in Table 11.1.

About 90% of the does older than one year, kidded during the year and 15-20% of the does kidded twice in the year. The average litter size from 874 kiddings during the year in the four villages was 1.72. 51% of the kidded does had twins, 39% had singles and 10% had triplets or quadruplets. The overall average litter size over five years was 1.68 from 5,662 kids born in 3,372 kiddings.

Table 11.1 Flock statistics of Osmanabadi goats at four centres

Year	Initial adult does(A)	New does registered (F)	No. of kids born (B)	Total (A+B+F) =C	No. of kids died (D)	Population growth (%) (B-D)*100A+F
2009-10	-	315	382	697	37	109.5
2010-11	305	504	1058	1867	172	109.5
2011-12	900	20	1450	2370	126	143.9
2012-13	680	38	1330	2048	100	171.3
2013-14	644	147	1498	2289	136	172.2
Overall		1024	5718	6742	571	502.6

Body weight

The least squares means of birth, 3, 6 and 9 month weights of kids from project villages in Satara, Osmanabad, Solapur and Ahmednagar districts are given in Table 11.2. There were 2286, 1555, 306 and 103 records for birth weight, 3-month weight, 6-month weight and 9-month weight, respectively. The overall least squares mean weight was 2.4±0.07 kg at birth, 10.5±0.2 kg at 3 months, 15.7±0.6 kg at 6 months, and 22.7±1.9 kg at 9 months. The phenotypic standard deviation of 3 month weights was 2.7 kg and that of 6 month weight was 3.8 kg, indicating substantial scope for selection. The highest weight at 3-months was 20.0 kg while the highest weight at 6 months was 30.8 kg.The average growth rate up to 3 months of single, twin and triplet kids was 102 gm, 82 gm and 75 gm per day, respectively. It was about 54 gm per day, 61 gm per day and 53 gm per day for single, twin and triplet born kids from 3 to 6 months of age. The average kid growth rates differed among villages. The average daily gain of kids up to 3 months age was higher in Karmala and Jamkhedtalukas (89 gm) than in Phaltantaluka (73 gm).

Table 11.2: Least squares means of body weight (kg) of Osmanabadi kids

Factor	Birth weight (kg)Up to 4 days from birth		Weight at 3 months (kg)		Weight at 6 months (kg)		Weight at 9 months (kg)	
	No.	LSM Weight ± s.e.	No.	LSM Weight ± s.e.	No.	LSM Weight ± s.e.	No.	LSM Weight ± s.e.
Overall mean	2286	2.4 ±0.07	1555	10.5 ± 0.2	306	15.7 ± 0.6	103	22.7 ± 1.9
Type of birth								
Single	511	2.8 ± 0.02	363	12.0 ± 0.1	75	16.9 ± 0.5	34	23.3 ± 1.1
Twin	1389	2.6 ± 0.02	988	10.0 ± 0.1	179	15.5 ± 0.4	53	21.9 ± 1.0
Triplet	365	2.2 ± 0.03	198	9.0 ± 0.2	48	15.0 ± 0.8	16	22.1 ± 1.7
Quadruplet	20	1.9 ± 0.13	6	8.1 ± 1.4	4	14.4 ± 3.4	-	-
Sex								
Male	1186	2.5 ± 0.04	815	10.5 ± 0.4	131	16.6 ± 0.9	43	24.0 ± 1.2
Female	1100	2.3 ± 0.04	740	9.0 ± 0.4	175	14.3 ± 0.9	60	20.9 ± 1.0
Birth year								
2009	-	-	145	10.5 ± 0.4	29	16.6 ± 1.2	6	22.3 ± 2.3
2010	139	2.3 ± 0.05	297	9.2 ± 0.4	86	14.4 ± 1.0	30	22.9 ± 1.2
2011	583	2.4 ± 0.04	445	10.0 ± 0.4	106	17.0 ± 1.0	36	25.0 ± 1.1
2012	734	2.4 ± 0.04	356	10.1 ± 0.4	47	15.2 ± 1.1	25	20.3 ± 1.1
2013	830	2.4 ± 0.04	312	9.2 ± 0.4	38	14.5 ± 1.1	6	16.3 ± 2.1

Dam parity

1	325	2.2 ± 0.04	170	9.3 ± 0.4	22	13.7 ± 1.2	11	20.9 ± 1.7
2, 3 and 4	673	2.4 ± 0.04	519	10.0 ± 0.4	74	16.6 ± 1.0	26	22.8 ± 1.4
5, 6 and 7	655	2.4 ± 0.04	477	10.1 ± 0.4	113	15.7 ± 0.9	42	22.0 ± 1.0
> 8	633	2.5 ± 0.04	389	9.7 ± 0.4	97	15.8 ± 1.0	24	24.0 ± 1.3

Taluka

Phaltan	436	2.4 ± 0.04	499	9.0 ± 0.4	83	13.8 ± 1.0	33	18.4 ± 1.2
Kalamb	142	2.3 ± 0.06	137	9.4 ± 0.5	56	16.8 ± 1.1	23	21.7 ± 1.5
Karmala	1302	2.3 ± 0.04	674	10.3 ± 0.4	121	15.9 ± 1.0	41	21.8 ± 1.0
Jamkhed	406	2.4 ± 0.04	245	10.4 ± 0.4	46	15.3 ± 1.1	6	27.8 ± 2.3

Milk production

The least squares means of 100 day milk yield for different levels of significant fixed effects are given in Table 11.3. The 100-day milk yield of does that had given birth to single, twin, triplet and quadruplet kids was 63.6±2.1 kg, 94.4±1.8 kg, 126.8±3.8 kg and 144.7±14.9 although there were only four records of does with quadruplets. There was about a 50% increase in milk yield with the increase in litter size from single to twins and a 34% increase when the litter size increased from twins to triplets. Goats from Kamone in Karmala taluka had 34% higher least-squares mean 100-day milk yield than those in Phaltan taluka. We have been able to identify good milk producing does in the villages. Eighteen does (2%) out of 887 does whose 100-day lactation milk yields were analyzed, were found to yield more than 200 litres and one doe had a 100-day lactation yield of 330 litres.

Table 11.3. Least squares means of 100-day milk yield of Osmanabadi does

Effect: Year of kidding of the doe

Year of kidding	Number of observations	Least squares mean ± standard error (kg)
2009	70	95.9 ± 5.5
2010	220	97.0 ± 4.5
2011	322	117.3 ± 4.3
2012	106	113.4 ± 4.7
2013	169	112.4 ± 4.5

Effect: Litter size of the doe

Litter size of the doe	No. of observations	Least squares mean ± standard error (kg)
1	313	63.6 ± 2.1
2	495	94.4 ± 1.8
3	75	126.8 ± 3.8
4	4	144.7 ± 14.9

Effect: Parity

Parity	Number of observations	Least squares mean ±standard error (kg)
1	93	100.5 ± 5.0
2, 3 and 4	271	110.9 ± 4.3
5, 6 and 7	279	109.1 ± 4.2
> 8	244	109.1 ± 4.1

Effect: Taluka

Taluka	Number of observations	Least squares mean ±standard error (kg)
Phaltan	334	96.3 ± 4.4
Kalamb	85	97.3 ± 5.2
Karmala	384	129.1 ± 4.4
Jamkhed	84	106.9 ± 5.0

Reproductive performance

The age at first kidding of 201 does born from 2009 to 2012 was available accurately. The average age at first kidding was 413+90 days (about 13.5 to 14 months) with a range of 249 to 703 days. This means that the average age at first ovulatory oestrus is 8.5 to 9 months. The average kidding interval was 282.7+83.4 days or 9.4 months.

Osmanabadi Buck Semen Freezing

We have frozen about 7000 semen doses of 25 Osmanabadi bucks in straws in the 'State of the Art Buck Semen Freezing and AI Centre' set up at Nimbkar Agricultural Research Institute with a grant from the Government of India under the 'Integrated Development of Small Ruminants Scheme'. Four thousand of these were given to the Government of Maharashtra and were supplied by the government to five district AI centres – Solapur, Ahmednagar, Aurangabad, Buldhana and Osmanabad. Seven hundred straws were given to field technicians in Satara, Solapur, Ahmednagar, Pune and Nashik districts and 100 straws were taken by veterinarians in Bangalore district in Karnataka. Five hundred doses have been deposited at the semen bank at NBAGR for breed conservation, as per the technical programme of the AICRP on Goat Improvement. Each dose contains 100 million spermatozoa and the post-thaw progressive motility of the frozen semen is >60%. The conception rate using frozen semen on cervical AI of does in natural oestrus at the goat keepers' door or brought to our farm was 50% on average. The Unit has thus refined, validated and implemented AI in the field. We have more than 1000 frozen semen doses of Osmanabadi bucks in storage.

Mortality

Year wise mortality in Osmanabadi goat field unit

Year	2009-10	2010-11	2011-12	2012-13	2013-14
Initial flock strength	-	305	900	680	644
New goats registered	315	504	20	38	147
Kids born	382	1058	1450	1330	1498
Total	697	1867	2370	2048	2289
Goats and kids died	50	208	151	123	162
Mortality (%)	7.2	11.1	6.4	6.0	7.1

Socio-Economic Survey

Goat keeping was a supplementary occupation to crop farming for the majority of the goat keepers under the project. Up to 90% of goat keepers from all project villages owned some land. About half the goat keepers from all project villages were young (in the 31-50 years age group) but one third to half the goat keepers in each centre were illiterate. Forty to 50% of the goat keepers in all the villages kept only one adult doe each while another 34 to 47% kept two to five adult does each. About half the does in the project were with families owning less than 5 does each while half were with families owning 6-20 does.

The main source of income from Osmanabadi goat rearing is sale of kids below one year of age. During 2013-14, 35% of the 879 male kids and 21% of the 902 female kids in the 3-6 months age group were sold while 63% of the 392 male kids and 40% of the 586 female kids in the 6-12 months age group were sold by project goat keepers.

The average kidding interval was 9.4 months, implying each goat had 1.3 kiddings per year. With the average litter size of 1.72 kids, this means 2.24 kids born per doe per year. With average 6% mortality in the 0 to 6 months age group, this means 2.1 saleable kids per doe per year. For an average sale weight of 14 kg and average sale price of Rs.180 per kg, this works out to a gross income of Rs.5,292 per doe per year.

Dissemination of Pro-Poor Goat-Based Technologies

For the first time in 2013-14, fodder seed of the legume *Desmanthusvirgatus* and of the multi-cut fodder sorghum variety COFS-29 developed by the Tamil Nadu Agricultural University was supplied to 16 participating goat keepers in Wadgaon and Kamone. They have developed small fodder plots using the seed and their goats have benefited from good quality home-grown fodder.

Four self-help groups (SHG) of women (61 members in total) were established in Wadgaon, Borla and Kamone. These are operating smoothly with regular meetings and micro-finance benefits to all members. The women SHG members of Wadgaon were trained in goat management and first-aid in evening one-hour sessions held in their village in the first week of January 2014 and three of the women can now do preliminary treatment of their goats. The training course started with nine trainees out of which five were enthusiastic and attended every session. They were given diaries and important points and hints from the training content were written in them. The topics covered in the training were:

· Importance of weighing kids
· How to estimate the expected sale price of a kid or goat
· How to estimate age of a goat from dentition
· How to select a goat for purchase
· Control of ecto-parasites such as ticks and fleas
· Importance of vaccination of goats and the three important goat vaccines ET, HS and PPR
· Sustainable worm control in goats, use of the FAMACHA chart to detect anaemia due to *Haemonchuscontortus* infection in goats
· Goat management at the time of kidding and feeding management of young and growing kids
· Types of wounds and methods of dressing and treating them
· How to detect sickness in goats and simple oral medicines for ailments of the respiratory and digestive systems

11.4   Gaps/constraints/shortfalls/excess and reasons thereof, if any
——Nil——

11.5   PC's evaluation: very good (A) Good (B) poor (C)
————————————Very Good (A)————————————

11.6   Future programme identifying the activities, timeline and targets for each of the activity

This Unit has to full fill not only the technical programme but also, refine, validate and implement AI in the field on trial basis.

11.7   Remarks

The Unit is doing very good work, is extremely responsive and benefitting farmers through the project.

12. Sangamneri Field Unit, Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, Maharashtra

12.1 Principal Investigator
Dr. Sanjay Mandakmale, Associate professor (LPM)

12.2 Activity assigned and targets fixed for each activity during the period
The Sangamneri unit, located at MPKV, Rahuri (MH) was given responsibility to improve goats at seven centres in Ahmadnagar, Nasik and Pune districts of Maharashtra state. They were to register approximately 1268 Sangamneri breedable does in 3 districts, 7 Tehsils and 24 villages and genetically improve the breed by following approve technical programme.

12.3 Activity carried out during the period
The Unit has registered 1268 breedable does in four clusters, supplied and exchanged 43 elite bucks in the selected clusters. The improvement in milk yield over the baseline population was 47.63 per cent. Organized two Goat Keepers Training Programme in collaboration with Agricultural Technology Information Centre, MPKV, Rahuri and also XIII Annual Review Meet 2013. Prophylactic measures were carried out by vaccinating 3840 goats against ET and PPR. Deworming of 3220 goats were carried out. Involved Rural Women Self Help Groups of Devlali Pravara (Ahmednagar) and Belha (Pune) in the Improvement Programme and motivated them to sell their kids on live weight basis. Farmers–Scientist forum of goat keepers is formulated for dissemination of new techniques of goat keeping viz. feeding of mineral mixture, timely vaccination and deworming. The same forum will be registered as Sangamneri goat breeders association. Refinement of ITK's viz; optimum age to provide drinking water, effect of free suckling, use of Neem lopping as dewormer, feeding of Tamarind leaves to control diarrhoea etc. is in progress.

Flock Statistics
The flock statistics of Sangamneri field unit has been presented in Table 12.1.. The opening balance of Sangamneri goats on 01.04.13 was 2456 and with the addition by birth of 1875 kids, the strength of Sangamneri goats has gone up to 4331. Out of which 907 animals were sold, and 216 were died during the period. The closing balance as on 31.03.14 was 3208. The population growth for year 2013-14 was 67.54 per cent.

Table 12.1: Flock strength of Sangamneri goat under field conditions

Age Group	Opening Balance(1–4–2013)	Closing Balance(31–3–2014)
Male:		
1 – 3 M	294	419
3 – 6 M	90	406
6 – 12 M	65	79
Adult	43	23
Total	492	927
Female:		
1 – 3 M	262	383
3 – 6 M	452	339
6 – 12 M	205	384
Adult	1045	1175
Total	**1964**	**2281**
G. Total	**2456**	**3208**

Body Weight

The overall means for body weights in Sangamneri kids at 1, 3, 6, 9 and 12 months of age were 4.96±0.05, 9.12±0.09, 13.71±0.21, 18.23±0.26 and 22.31±0.34 kg, respectively (Table 12.2). All the non genetic factors viz. village cluster, year of birth, season of birth, type of birth and sex exerted significant (P<0.01) influence on body weights at all the ages except the season of birth had non-significant influence on body weight at 9 and 12 month and type of birth on 12 month of age. While body weight of all the ages were significantly (P<0.01) influenced by sire.

Table 12.2: Body weights at various age groups of Sangamneri goats

Year	Body weights (kg)				
	1 Month	3 Months	6 Months	9 Months	12 Months
2011-12	4.92±0.09 (112)	9.35±0.25 (84)	12.67±0.32 (68)	16.81±0.54 (51)	20.40±0.81 (26)
2012-13	4.91±0.07	9.04±0.18	13.54±0.22	18.31±0.30	22.72±1.05
2013-14	4.96±0.05 (7974)	9.12±0.09 (7024)	13.71±0.21 (2569)	18.23±0.26 (1638)	22.31±0.34 (1086)

Milk Production

The results revealed that the year of kidding and kidding order had significant (P<0.01) effect on 90 days milk yield, while the village cluster and season of kidding had exerted non significant effect on 90 days milk yield . The overall least squares means for 90 days milk yield was 92.69± 1.90 (Table 12.3). The improvement of 47.63 per cent in average test day milk yield was noticed over the baseline year 2002-03.

Table 12.3: Least square means for daily milk yield (l) in Sangamneri goats

Source of variation	90 Days Milk yield		
	N	Mean	S. E.
Overall Mean (μ)	883	92.69	1.90
Village cluster	NS		
1	408	93.09	1.80
2	223	90.85	2.00
3	227	93.33	2.00
4	25	93.50	3.17
Year of kidding			
2010-11	114	82.97	1.74
2011-12	139	78.53	1.67
2012-13	44	70.91	2.39
2013-14	58	81.98	2.42

Reproduction

The reproductive performance of Sangamneri goats was recorded and presented in Table 12.4. The overall means for age at maturity, age at first conception, age at first kidding, service period and kidding interval were 251.05±3.70, 318.53±13.41, 469.53±13.57, 118.27±9.20 and 266.36±9.45 days, respectively in the progeny of Sangamneri bucks supplied by projects. The number of kids per kidding was 1.84±0.07. The non-genetic factors i.e. village clusters and year and season of birth had significant influence on pre-partum traits except year of birth had non-significant influence on age at maturity. Type of birth had non-significant influence on all the pre-partum reproductive traits under study. While the post-partum reproductive traits viz. village cluster and season of kidding had exerted significant influence on post-partum traits except no. of kids per kidding. No. of kids per kidding significantly influenced by year and season of kidding. The kidding rate/litter size was 1.84.

Table 12.4: Reproductive Performance of Sangamneri goats

Sl.No.	Particulars	Year		
		2010-11	2012-13	2013-14
1.	Age at Puberty (d)	—	247.1±8.7(5)	251.05±3.70(371)
2.	Age at first conception (d)	—	256.2±28(12)	318.53±13.41(634)
3.	Age at first kidding (d)	—	427±33.8(5)	469.53±13.57(620)
4.	Service period (d)	89.0±30.2(03)	91.0±13(22)	118.27±9.20(754)
5.	Kidding Interval (d)	211.1±40.3(02)	262.87±8.6(15)	266.36±9.45(703)
6.	No. of kids/ kidding	1.67±0.08(64)	1.77±0.08(75)	1.84±0.07(1287)

Health Management

The Prophylactic activities are presented in Table 12.5. A total number of 2719 goats were provided prophylactic treatment in the project area. The overall mortality during the year 2013-14 was 4.99 per cent in the field conditions. However, the highest mortality was observed in the age group of 0-3 months due to Colibacillosis and Pneumonia.

Table 12.5: Prophylactic measures adopted for Sangamneri goats

Sl.No.	Prophylactic measures	Number of Observations				
		2009-10	2010-11	2011-12	2012-13	2013-14
1.	Deworming	1710	1742	1839	2719	2719
2.	Vaccination FMD	1703	1639	1722	-	
3.	Vaccination E.T.	1703	1639	1722	2842	2842
4.	Treatment	815	980	1425	1728	1728
5.	PPR	----	----	----	----	3260

12.4 Gaps/constraints/shortfalls/excess and reasons thereof, if any

· The encroachment of the other breeds in the breeding tract of Sangamneri due to uncontrolled breeding of goat under field condition resulted in dilution of elite Sangamneri population. Hence, it is essential to maintain an elite germplasm of Sangamneri does at project level as a buck mother farm.

· The Sangamneri goats are reared in 2 to 5 numbers, large flocks of pure Sangamneri goats are scanty in the field, which affects the proper selection of pedigreed bucks.

· Maximum population of Sangamneri goats is concentrated in urban areas, but unfortunately nobody is taking risk to maintain the bucks to provide the services to other goat owners.

· The policies adopted by State Animal Husbandary Department to provide 10+1 unit of Osmanabadi goats in breeding tract had deviating the goat keepers from Sangamneri breed which has been brought to the notice of authorities.

· The shortage of contingent funds has not allowed to provide regular incentives in terms of mineral mixture, kids starter, pregnancy allowance etc. resulted in poor birth weights and other parameters

· Shortage of fund under salary head

12.5 PC's evaluation: very good (A) Good (B) poor (C)

———————————Very Good (A)———————————

12.6 Future programme identifying the activities, timeline and targets for each of the activity

The Unit is continued to implement technical programme in farmer's field which consists of:

1. Mapping of breeding tract and dividing the breeding tract into 4 clusters
2. Survey for analysing baseline data.
3. Purchase of male kids from farmers' flock.
4. Rearing the male kids till age of sexual maturity.
5. Distribution of bucks, breeding of flocks and recording of data.
6. Recording of performance on body weight and milk yield etc.
7. Collection of data on socio-economics and managemental practices.
8. Selection of male and females.
9. Collection of semen from improved bucks and storage in semen bank.
10. Collection information on marketing.
11. Establishment of co-operative/self-help groups.
12. Evaluation of role of women in goat rearing in the area.
13. Establishment of elite flock.

12.7 Remarks

This Unit has been able to show impact in farmers flock by implementing health control practices and providing improver breeding bucks. Greater emphasis is to be given to field data recording and capacity building of farmers.

13. Sirohi Field Unit, Vallabhnagar, Rajasthan Univ. of Veterinary & Animal Sciences, Udaipur, Rajasthan

13.1   Principal Investigator
Dr. R. K. Nagda, Professor (LPM)

13.2   Activity assigned and targets fixed for each activity during the period
The unit was assigned to improve Sirohi goat breed in farmers field following technical programme of the project.

13.3   Activity carried out during the period
·   The genetic parameters for growth, lactation and reproductive traits were estimated.
·   Total 28 breeding bucks were distributed to registered farmers during the report period for further genetic improvement in the field.
·   During report period deworming of 2145 animals, ecto-parasiticide dipping 2480, ET vaccination 1250 and PPR vaccination of 600 animals were done.
·   The major diseases observed in the registered animals were enteritis and pneumonia.
·   619 animals were sold during report period. Out of which 444 (71.73%) animals were sold for breeding purpose.

Detailed Achievements
This field unit is located at RAJUV&AS, Vallabhnagar (Raj.). The survey work is being conducted in two districts of Sirohi goat tract i.e. Rajasmand and Udaipur at four centres viz., Vallabhnagar, Railmagra, Devgarh and Nathdawara were established for registration and performance recording of the Sirohi goats under field condition.

Flock Statistics
The flock strength of registered animals under field unit was 1220 including 980 females as on 31 March, 2014 (Table 13.1). During the year 2013-14, addition due to birth was 496 while reduction due to death and sale of animals were 66 and 619 respectively. Total 1465 animals among different age group were draft during the report period. The population growth during the report period was 81.75%.

Table 13.1: Flock statistics of Sirohi goats at different centres (2013–14)

Age Group	Opening Balance(01-04-13)	Closing Balance(31-03-14)
Male		
0-1 M	5	12
1-3 M	79	54
3-6 M	135	99
6-12M	51	49
Adult	54	26
Total	324	240
Female		
0-1 M	7	11
1-3 M	75	66
3-6 M	140	124
6-12 M	79	51
Adult	784	728
Total	**1085**	**980**
Grand Total	**1409**	**1220**

Body Weight

The least square means of body weight at birth, 3, 6, and 9 months of age was was 2.46±0.03, 13.72±0.19, 18.00±0.29, 21.83±0.53 and 26.32±0.51 kg, respectively (Table 13.2). Period had significant effect on body weight at different age groups. Season of kidding had significant effect on body weight. Male and single born kids were significantly heavier over females and multiple born kids. The heritability of body weight at birth was moderate to high as at other different ages was found to be higher. The genetic correlation among 3, 6, 9 and 12 month was high and positive. The phenotypic correlation coefficients of birth weight with 3, 6 and 12 months of body weight were also positive. The selection differential for body weight was 4.89 kg.

Table 13.2: Least square means of body weight in Sirohi goats

Factor	Weight at (Kg)				
Year	Birth	3M	6 M	9 M	12 M
2011-12	2.48±0.04 [c] (668)	14.51±0.24 [c] (570)	19.47±0.33 [e] (406)	24.20±0.55 [d] (301)	29.14±0.65 [c] (221)
2012-13	2.52±0.04 [c] (651)	14.69±0.24 [c] (528)	19.77±0.35 [e] (202)	25.56±0.68 [e] (47)	—
2013-14	2.54±0.04 [d] (496)	13.98±0.25 [b] (371)	19.34±0.38 [e] (160)	23.31±0.80 [cde] (27)	—

Milk Production

The mean for 90, 150 days milk yield and total lactational yield was 72.08±2.79, 104.29±3.49 and 104.60±3.45 lit., respectively (Table 13.3). Year of kidding affected the 90, 150 days and lactation milk yield. The lactation length was 151.11± 0.37 days. The production performance in terms of 90, 150 days milk yield and total lactation yield improved over years. Doe kidded during November – February, had significant higher milk yield as compared to doe kidded during other seasons. The lactation order played a significant role in milk yield. The heritability of 90 days and total lactation milk yield was found to be higher Phenotypic correlation between 90 days yield and lactation length was high and positive. The genetic association between 90 days milk yield and lactation yield was positive. The selection differential for milk yield was 9.75 lit.

Table 13.3: Milk Production performance of Sirohi goats under field condition

Factor	90 days milk(lit)	150 days milk(lit)	Lactation yield(lit)	Lactation length(days)
Year of kidding				
2011-12	73.71±3.07 [c] (399)	107.48±3.71 [c] (269)	107.45±3.66 [b] (269)	150.45±0.51 [a] (269)
2012-13	76.86±3.09 [a] (431)	110.74±3.80 [d] (247)	110.64±3.66 [c] (247)	150.24±0.56 [a] (247)
2013-14	85.96±3.06 [e] (309)	119.10±3.98 [d] (210)	118.95±3.96 [d] (210)	149.75±0.59 [a] (210)

Reproduction

The age at first matting and first kidding was 447.11±28.02 days and 590.73±27.98 days, respectively. On the other hand, weight of doe at first matting and first kidding was 27.39±0.29 and 30.11±0.27 kg, respectively. The service period and kidding interval was 278.68±9.48 and 428.82±9.43 days, respectively (Table 13.4).

Table 13.4: Least squares mean for reproductive traits in Sirohi goats

Traits/ Year	Age at first mating (days)	Weight at first mating (kg)	Age at first kidding (days)	Weight at first kidding (kg)	Service Period (days)	Kidding Interval (days)
2011-12	560.6±24.9 (72)	26.65±0.2 (72)	710.5±24.98 (72)	29.3±0.23 (72)	235.1±10.8 (178)	383.3±10.76 (178)
2012-13	561.6±25.86 (67)	26.16±0.26 (67)	712.25±25.89 (67)	29.57±0.24 (67)	223.60±6.99 (428)	372.63±6.94 (428)
2013-14	447.11±28.02 (56)	27.39±0.29 (56)	590.73±27.98 (56)	30.11±0.27 (56)	278.68±9.48 (249)	428.82±9.43 (249)

Health Management

During the year 2013-14, total 1250 and 600 animals were vaccinated against Enterotoxaemia and PPR during report year. Total 2145 and 2840 animals were covered under treatment to control the endo and ecto-parasitic infestation, respectively. A total of 949 animals were treated for different diseases. Even after regular deworming of the registered animals, Enteritis was encountered as a major disease affecting the goats during the report period, followed by pneumonia. The overall mortality was 1.97%.

Table 13.5: Prophylactic measures adopted for Sirohi goats

Sl. No	Prophylactic measures	Number of animals
1.	Deworming	2145
2.	Dipping	2840
3.	Vaccination FMD	-
4.	Vaccination E.T	1250
5.	Vaccination PPR	600
6.	Vaccination H.S./Other	-
7.	Drenching	-

13.4   Gaps/constraints/shortfalls/excess and reasons thereof, if any
——Nil——

13.5   PC's evaluation: very good (A) Good (B) poor (C)
——————————-Very Good (A)——————————

13.6.   Future programme identifying the activities, timeline and targets for each of the activity

The demands of the breeding bucks are very high for this breed. The Unit has to evolve capabilities to identify, select and make farmers rear superior goats for future breeding purpose apart from implementing the technical programme.

13.7   Remarks

The Unit has to reorganise itself for speedy implementation of the project. Necessary man-power and infrastructure is to be provided on priority basis.

14. Surti Field Unit, Navsari Agricultural University, Navsari, Gujarat

14.1   Principal Investigator

Dr. K.K.Tyagi, Scientist (Animal Genetics and Breeding)

14.2   Activity assigned and targets fixed for each activity during the period

The unit was assigned to improve Surti goat breed in farmers field following technical programme of the project.

14.3   Activity carried out during the period

·   The genetic parameters for growth, lactation and reproductive traits were estimated.

·   Improvement in body weight at different ages, lactation and reproductive performance was observed.

·   Season of birth had significant effect on body weight.

·   Male and single born kids were significantly heavier than female and multiple born kids.

·   The overall average lactation yield and lactation length was 178.14 ± 2.97 (128) lit, and 165.81 ± 1.80 (171) days, respectively.

·   Season of kidding had significant effect on milk yield.

·   During report period deworming of 2165animals along with distribution of mineral mixture and antibiotics to 1510 animals was undertaken.

·   The major diseases observed in the registered animals were enteritis and pneumonia, necessary measures were taken accordingly.

Detailed Achievements

Surti Field Unit is located at NAU, Navsari (Gujarat). The survey work in six clusters (Bharuch, Surat and Navsari districts) was undertaken to collect the information pertaining to management and breeding practices followed by the goat keepers were collected.

Flock Statistics

The flock statistics of Surti goats under field unit is shown in Table 14.1. The flock strength of registered animals under field unit was 684 including 595 females as on 31 March, 2014. Out of this, 25 new adult goats were identified and included in the clusters for recording of data. During the year 2013-14, addition due to birth was 520 out of which 261 were white Surti adding 131 male and 130 female white Surti kids respectively. Reduction due to death and sale of animals was 182 and 352 respectively. At the end of year only 12 adult white Surti males were available due to preferential selling of white males by goat owners from 6 months age onwards. Total 1064 animals among different age groups were drafted during the report period. The overall population growth was 95.67%.

Table 14.1: Flock statistics of Surti goats

Age Group	Opening balance 01-04-2013		Closing balance 31-03-2014	
Male	W	NW	W	NW
0-1 M	19	20	15	16
1-3 M	19	14	15	11
3-6 M	30	30	35	32
6-12 M	8	17	12	14
Adult	18	25	12	17
Total	94	106	89	90
Female				
0-1 M	14	12	12	11
1-3 M	16	14	12	9
3-6 M	24	32	35	28
6-12 M	15	18	14	9
Adult	485	45	522	55
Total	**554**	**121**	**595**	**112**
Grant Total	**648**	**227**	**684**	**202**

Body Weight

The body weights of Surti kids are present in Table 14.2. The least square means for body weight at birth, 3, 6, 9 and 12 months of ages was 2.008 ± 0.026, 9.984 ± 0.113, 17.287 ± 0.165, 20.073 ± 0.185 and 23.276 ± 0.504 kg, respectively. Season of birth, sex of kid, colour type of birth had significantly affected the body weights. Kids born between November and February months (winter) had higher birth weights at birth, 3, 6 and 9 months. Kids born during summer had shown highest body weight at 12 month of age. Single born kids were significantly heavier than the multiple born kids during first nine months, whereas differences get subsides as they approach 12 months of age. Kids born in Navsari clusters had significantly lower body weight at all ages as compared to other clusters. Best performance in body weight was shown by kids born in Bilimora and Vapi cluster at birth and 3 months of age. Body weights were par at 12 months of age in all the clusters.

Table 14.2: Body weights (kg) of Surti Kids born during last three years

Year	Body weights				
	Birth	3 Months	6 Months	9 Months	12 Months
2011-12	1.95±0.03 (500)	10.52±0.34 (404)	17.81±0.10 (320)	21.81± 0.12 (243)	23.47±0.22 (104)
2012-13	2.03±0.03 (496)	10.07±0.11 (288)	17.48±0.26 (235)	20.23±0.29 (188)	23.43±0.59 (102)
2013-14	2.008±.026 (520)	9.984 ± 0.113 (302)	17.287±0.165 (248)	20.073±0.185 (200)	23.276±0.504 (99)

Milk Production

The overall least square means for milk yield over 90 days, 150 days, lactation yield and lactation length were 120.22 ± 1.27, 169.99 ± 2.19, 178.14 ± 2.97 liters and 165.81 ± 1.80 days, respectively (Table 14.3). Season of kidding has significant effect on milk yield and goat kidded during the July to October remained low producer throughout. Clusters also imported significant differences in lactation length, 90 day milk yield and total lactation yield. Bharuch was adjudged to be the best cluster with total lactation milk yield of 195.42 ± 4.83 litres per goat. Surti goats proved to be a very good milch breed with a range of 129-285 litres milk in complete lactation.

Table 14.3: Milk production in Surti Goats

Period	90 days MY (l)	150 days MY (l)	Lactation MY (l)	Lactation length (d)
2011-12	119.20± 1.45 (105)	167.86 ± 1.96(91)	181.44 ± 3.13 (105)	173.06 ± 2.56 (105)
2012-13	122.14 ± 1.49 (145)	170.48 ± 2.96 (110)	183.62 ± 3.93 (110)	165.76 ± 2.11 (145)
2013-14	120.22 ± 1.27 (171)	169.99 ± 2.19 (128)	178.14 ± 2.97 (128)	165.81± 1.80 (171)

Reproduction

During the year 2013-14, age at first mating, weight at first mating, age at first kidding, weight at first kidding, service period, kidding interval and gestation period was 506.41 ± 29.65 days, 21.45 ± 0.48 Kg, 651.36 ± 29.79 days, 22.95 ± 0.48 Kg, 197.17 ± 4.47, 347.21 ± 4.70 and 150.04 ± 0.33 days, respectively. The kidding rate (litter size) was 1.48 justifying higher prolificacy in Surti Goats (Table 14.4).

Table 14.4: Reproduction performance of Surti goats

Sl.No.	Parameters	2013-14
1.	No. of Does available for breeding	485
2.	No. of Does bred (due to repeat breeding)	412
3.	Tupping%	84.95
4.	Does died/sold/culled between breeding and kidding	22
5.	No. of Does available for breeding	390
6.	Tupped Does available at kidding	379
7.	Does Kidded	351
	Single	186
	Double	161
	Triplet	4
8.	Actual live birth	520
9.	Breeding efficiency/Fertility(On the basis of Does available)	83.92
10.	Breeding efficiency/Fertility(On the basis of Does kidded)	115.95
11.	Kidding%(On the basis of Does available)	107.22
12.	Kidding%(On the basis of Does conceived)	133.33
13.	Kidding rate (Litter size)	1.48

Health Control Measures

During current year 2165 animals were dewormed, Mineral mixture and antibiotics were distributed for use in 1510 animals. Overall mortality in Surti flock was 7.33%.

14.4 Gaps/constraints/shortfalls/excess and reasons thereof, if any
—Nil—

14.5 PC's evaluation: very good (A) Good (B) poor (C)
————————————— Very Good (A) —————————————

14.6 Future programme identifying the activities, timeline and targets for each of the activity
Apart from implementing the technical programme, Unit has to support one of the first Goat Cooperative established with motivation and technical backup of this Unit.

14.7 Remarks
The Unit has significantly improved its operation in the field and impact is visible on productivity and health of goats. The Farmers have been benefitted and willing to participate in most activities of the project. Unit was successful in motivating farmers to establish a goat cooperative.

(C) Financial/Administrative Evaluation 2013-14

Unit wise financial evaluation format is depicted below. The staffing pattern given was as per ICAR letter F. No. 5-3/97-ASR II Dated 23rd November 2000. However some modifications have been made in staff position at Institute and Council level for each of the unit.

a. Project Co-ordinating unit

SNo.	Particulars	Detail
i)	Name of centre and year of initiation	Project co-ordinating cell, CIRG Makhdoom, Mathura 1971-72
ii)	No. of sanctioned posts and designation*	Project coordinator – One Senior Scientist – One Scientist – One Sr. programmer – One Sr. computer – One Jeep driver – One Assistant administrative officer – One Assistant account officer – One Office superintendent – One Jr. stenographer – One Junior Clerk – One Livestock Attendant – One Messenger – One
iii)	No. of posts filled	1. Assistant Administrative Officer 2. Technician T-II 3. Livestock Attendants - 1
iv)	No. of posts vacant (vacant since when)	Other posts are vacant
v)	Funds released during the year (2013-14)	5,03,000
vi)	Previous balance	Nil
vii)	Funds utilized	3,34,787
viii)	Closing balance	1,68,213
ix)	Remarks of PC	The PC Unit was allocated Rs. 15.50 lakh in BE. Because of administrative lapses and lack of support most fund was not utilized by the month of December, then in RE fund was drastically reduced. Even after RE, when the fund could not be utilised then RE was modified with reduced fund allocation to this Unit to meet the demand of other units. As such, percent expenditure incurred on BE basis was 21.5% and revise RE 66.4%. Detailed head wise allocation and expenditure is given in Annexure I. The RA, SRF could not be recruited and no equipment were purchased.

* Few posts were withdrawn by the Institute/ICAR. Records are not available.

b. Research Units

1.   Barbari Unit, CIRG Makhdoom, Mathura

SNo.	Particulars	Detail
i)	Name of centre and year of initiation	Barbari farm unit, CIRG Makhdoom01.04.1993 (VIII Plan);
ii)	No. of sanctioned posts and designation	Senior Scientist – One Assistant Farm Manager – One Livestock Assistant - Two Lab. Attendant – One Junior Clerk – One Livestock Attendant - 17
iii)	No. of posts filled	Senior Scientist – One Livestock Assistant – One Livestock Attendants – 13
iv)	No. of posts vacant (vacant since when)	Assistant Farm Manager – One Livestock Assistant – One Lab. Attendant – One Junior Clerk – One Livestock Attendants – 04
v)	Funds released during the year (2013-14)	6,25,000/-
vi)	Previous balance	Nil
vii)	Funds utilized	4,65,203
viii)	Closing balance	1,59,797
ix)	Remarks of PC	The Barbari Unit was allocated Rs. 19.50 lakh in BE. Because of administrative lapses and lack of support most fund was not utilized by the month of December, then in RE fund was drastically reduced. Even after RE when the fund could not be utilised then RE was modified to meet the demand of other units. As such, percent expenditure incurred on BE basis was 23.8% and revise RE 74.4%. Detailed head wise allocation and expenditure is given in Annexure I. The RA, SRF could not be recruited and no equipment were purchased. The project suffered due to lack of staff.

2. Jamunapari Unit, CIRG, Makhdoom

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Jamunapari farm unit, CIRG Makhdoom01.04.1993 (VIII Plan); AICRP on Goats
ii)	No. of sanctioned posts and designation	Senior Scientist – One Scientist – One Assistant Farm Manager –One Livestock Assistant – Two Lab. Attendant – One Clerk – One Livestock Attendant – 19
iii)	No. of posts filled	Scientist – One Livestock Assistant – Two Lab Attendant – One Livestock Attendant – 14
iv)	No. of posts vacant (vacant since when)	Senior Scientist – One Assistant Farm Manager – One Junior Clerk – One Livestock Attendant – 5
v)	Funds released during the year (2013-14)	6,22,000/-
vi)	Previous balance	Nil
vii)	Funds utilized	4,86,808
viii)	Closing balance	1,35,192
ix)	Remarks of PC	The Jamunapari Unit was allocated Rs. 24.50 lakh in BE. Because of administrative lapses and lack of support most fund was not utilized by the month of December, then in RE fund was drastically reduced. Even after RE when the fund could not be utilised then RE was modified to meet the demand of other units. As such, percent expenditure incurred on BE basis was 19.9% and revise RE 78.4%. Detailed head wise allocation and expenditure is given in Annexure I. The RA, SRF could not be recruited and no equipment were purchased. The project suffered due to lack of staff.

3.   Sirohi Unit, CSWRI, Avikanagar, Tonk, Rajasthan

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Sirohi farm unit, CSWRI, Avikanagar01.04.1993 (VIII Plan); AICRP on Goats at Avikanagar came into existence on 14.12.1976 but with different technical programme. The project in current form is in operation since 01.04.1993 (VIII Plan);
ii)	No. of sanctioned posts and designation	Senior Scientist – One Scientist - Four Assistant Farm Manager – One Farm manager – One Livestock Assistant - Two Office Suptd. - One Junior Clerk – One Livestock Attendant - 15
iii)	No. of posts filled	NA
iv)	No. of posts vacant (vacant since when)	NA
v)	Funds released during the year (2013-14)	11,80,000 (RE)
vi)	Previous balance	2,80,000
vii)	Funds utilized	10,41,358
viii)	Closing balance	1,38,642
ix)	Remarks of PC	The expenditure made by the Unit was satisfactory except for TA. The provision of TA was made for field visits. The Unit need to recruit RA/SRF as per provisions.

4.   Assam Hill Unit, AAU, Burnihat (Assam)

S. No.	Particulars	Detail
i)	Name of the centre and year of initiation	All India Coordinated Research project On Goat Improvement (Assam Hill Goat Field Unit), Goat Research Station, Assam Agricultural University, Burnihat, Assam-793 101. Date of Start 01.04.2009
ii)	No. of sanctioned posts and designation	No provision of post was made in SFC. However, Unit is following the staffing pattern of older field Units and work to be done on contract.
iii)	No. of posts filled	The Unit is working with contractual workers, Research Associates and Assistants.
iv)	No. of posts vacant (vacant since when)	Nil
v)	Funds released during the year(2013-14)	22,50,000(RE)
vi)	Previous balance	(-)2,18,238.25
vii)	Funds utilized	20,49,522
viii)	Closing balance	17,760
ix)	Remarks of PC	This Unit is only one unit funded from NEH sub plan therefore getting higher share of fund as compared to other Units with same technical programme and objectives. Provision of RA and SRF have been made in XII Plan to strengthen this Unit. The salary is to be paid from operational cost of the project. New staffing pattern has been proposed in XII plan so as to provide qualified staff for quality implementation of the project.

5. **Black Bengal Unit, Kolkata**

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Black Bengal Unit, WBUA&F, KolkataInitiation: 2001
ii)	No. of sanctioned posts and designation	Sr. Scientist – 1 Vety. Officer – 1 Tech. Asstt. – 2 RA – 1 SRF – 1 Clerk – 1
iii)	No. of posts filled	03 (One tech. Asstt. in lieu of V.O.)
iv)	No. of posts vacant (vacant since when)	Sr. Scientist-1 Veterinary Officer-1 Technical Asst.-1 Livestock Assistant -3 Jr Clerk - 1
v)	Funds released during the year(2013-14)	14,41,000(RE=25.00 Lakh)
vi)	Previous balance	10,59,177
vii)	Funds utilized	13,19,089
viii)	Closing balance	11,81,088
ix)	Remarks of PC	The unit has not been able to utilise fund especially in salary grant. Provision of RA and SRF have been made in XII Plan to strengthen this Unit. RC was not utilised because of increased fund in RE.

6.   Black Bengal Unit, Ranchi

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Birsa Agricultural University, Ranchi, JharkhandInitiation : 01.04.2009
ii)	No. of sanctioned posts and designation	No provision of post was made in SFC. However, Unit is adhering the norms laid down for older field Units and work is got done on contract.
iii)	No. of posts filled	The Unit is working with contractual workers, Research Associates and Assistants
iv)	No. of posts vacant (vacant since when)	Not Applicable
v)	Funds released during the year(2013-14)	11,60,000 (RE 16.10 Lakh)
vi)	Previous balance	20,46,273
vii)	Funds utilized	15,56,649
viii)	Closing balance	5,90,624
ix)	Remarks of PC	This Unit is partially funded from TSP budget. Provision of RA, SRA and SRF have been made in XII Plan to strengthen this Unit. The unit was able to utilize about 96.0% of budget.

7.   Gaddi Unit, Palampur (HP)

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Gaddi Field Unit, HPKV, Palampur, 17.02.2009
ii)	No. of sanctioned posts and designation	No provision of post was made in SFC. However, Unit is adhering the norms laid down for older field Units and work is got done on contract.
iii)	No. of posts filled	The Unit is working with contractual workers, Research Associates and Assistants
iv)	No. of posts vacant (vacant since when)	Not Applicable
v)	Funds released during the year(2013-14)	18,43,000(RE=21.00 lakh)
vi)	Previous balance	2,56,682
vii)	Funds utilized	22,42,276
viii)	Closing balance	(-) 1,42,594
ix)	Remarks of PC	The unit spent about Rs. 1.42 lakhs in excess to that of allocation. That might be due to reduction in RE at late stage. Provision of RA, SRA and SRF have been made in XII Plan to strengthen this Unit. The salary is to be paid from operational cost of the project.

8.   Ganjam Unit, Bhubaneswar

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	AICRP on goat improvement, Ganjam Field Unit, OUAT, BhubaneswarYear of Initiation: 2001
ii)	No. of sanctioned posts and designation	Senior Scientist - 1 Vety Officer-1 Tech Asstt. - 1 Livestock Asstt.- 3 Clerk-1 **Total – Seven (7)**
iii)	No. of posts filled	Six (6)
iv)	No. of posts vacant (vacant since when)	One, Vety. Officer, since 2009-10
v)	Funds released during the year(2013-14)	11,80,000(RE=25.00 Lkah)
vi)	Previous balance	11,20,387
vii)	Funds utilized	23,49,238
viii)	Closing balance	(-) 48,851
ix)	Remarks of PC	The unit was able to utilize fund up to satisfaction. The staffing pattern has changed.

9. Malabari Unit, Thrissur (Kerala)

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Centre for Advanced Studies in Animal Genetics and Breeding, College of Veterinary and Animal Sciences, Mannuthy, Kerala Veterinary and Animal Sciences University2001
ii)	No. of sanctioned posts and designation	Senior Scientist/Associate Professor- 1 Asst. Professor/(Veterinary Officer)- 1 Technical Officer - 1 Livestock Assistants- 3 Jr. clerk - 1
iii)	No. of posts filled	Senior Scientist/Associate Professor- 1 Asst. Professor/(Veterinary Officer)- 1 Asst. Grade II- 1 Senior Research Fellow- 1 Livestock Assistants- 3
iv)	No. of posts vacant (vacant since when)	Technical Officer Gr.II- 1(since July 2012)
v)	Funds released during the year (2013-14)	27,00,000(RE=25.00)
vi)	Previous balance	Nil
vii)	Funds utilized	21,23,053
viii)	Closing balance	5,76,947
ix)	Remarks of PC	The bifurcation of University into two has created problem in proper submission of AUC. Even the AUC did not show the exact fund released by the PC Unit, therefore, AUC submitted by the new University was completely faulty, hence not accepted. The Unit Incharge was told to resubmit AUC. Provision of RA, SRA and SRF have been made in XII Plan to strengthen this Unit. The salary is to be paid from operational cost of the project. New staffing pattern has been proposed in XII plan so as to provide qualified staff for quality implementation of the project.

10. Marwari Unit, Bikaner

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Marwari Field Unit, RAJUVAS, Bikaner, 18th May 1988.
ii)	No. of sanctioned posts and designation	Sr. Scientist-1 (filled) Veterinary Officer-1 (filled) Fam manager- 1 Jr. technical officer-1 Livestock Assistant -3 (filled) Jeep driver.-1 Jr. clerk- 1 Livestock Attendant .- 5
iii)	No. of posts filled	06
iv)	No. of posts vacant (vacant since when)	Nil
v)	Funds released during the year(2013-14)	9,60,000 (RE=24.54)
vi)	Previous balance	(+) 14,93,697
vii)	Funds utilized	13,48,127
viii)	Closing balance	(+)11,05,570
ix)	Remarks of PC	The unit was not able to utilize the fund allocated to them. Provision of RA and SRF have been made in XII Plan to strengthen this Unit. The salary is to be paid from operational cost of the project. New staffing pattern has been proposed in XII plan so as to provide qualified staff for quality implementation of the project.

11.   Osmanabadi Unit, NARI, Phaltan (MH)

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Osmanabadi Unit, NARI, Phaltan01.04.2009
ii)	No. of sanctioned posts and designation	No provision of post was made in SFC. However, Unit is following the staffing pattern of older field Units and work to be done on contract..
iii)	No. of posts filled	The Unit is working with contractual workers, Research Associates and Assistants.
iv)	No. of posts vacant (vacant since when)	Not Applicable
v)	Funds released during the year(2013-14)	21,86,000 (RE)
vi)	Previous balance	Nil
vii)	Funds utilized	21,86,000
viii)	Closing balance	Nil
ix)	Remarks of PC	The Unit has been able to utilize fund. Provision of RA, SRA and SRF have been made in XII Plan to strengthen this Unit. The salary is to be paid from operational cost of the project. New staffing pattern has been proposed in XII plan so as to provide qualified staff for quality implementation of the project.

12. Sangamneri Unit, MPKV, Rahuri (MH)

S. No.	Particulars	Detail
1	Name of centre and year of initiation	**Sangamneri Field Unit, MPKV, Rahuri**Initiation: 2001
2	No. of sanctioned posts and designation	Senior Scientist- 1 Veterinary Officer-1 Technical Assistant -1 Livestock Assistant -3 Jr. Clerk-1
3	No. of posts filled	07
4	No. of posts vacant (vacant since when)	Nil
5	Funds released during the year(2013-14)	28,92,000 (RE 35.50)
6	Previous balance	(-) 1,91,465
7	Funds utilized	34,97,819
8	Closing balance	(-)7,97,284
9	Remarks of PC	

13. **Sirohi Unit, Vallabhnagar (Raj.)**

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	AICRP on Goat Improvement (Sirohi Field Unit), Livestock Research Station, Vallabhnagar (Udaipur) **23RD NOVEMBER, 2000**
ii)	No. of sanctioned posts and designation	Senior Scientist- 1 Veterinary Officer-1 Technical Assistant -1 Livestock Assistant -3 Jr. Clerk-1
iii)	No. of posts filled	05
iv)	No. of posts vacant (vacant since when)	02 LSA post vacant (but two LSA working on contractual basis through service provider)
v)	Funds released during the year (2013-14)	4,60,000 (RE=26.1 Lakh)
vi)	Previous balance	(+) 21,38,450
vii)	Funds utilized	24,22,793
viii)	Closing balance	(+) 1,75,657
ix)	Remarks of PC	

14. Surti Unit, Navsari (Gujarat)

S. No.	Particulars	Detail
i)	Name of centre and year of initiation	Surti Field Unit, Livestock Research Station, Navsari Agricultural University, Navsari-396450, GujaratSince; 2000
ii)	No. of sanctioned posts and designation	Senior Scientist- 1 Veterinary Officer-1 Technical Assistant -1 Livestock Assistant -3 Jr. Clerk-1
iii)	No. of posts filled	02
iv)	No. of posts vacant (vacant since when)	05 V.O. : since 03-02-2012 Tech. Asstt.: since 01-01-2001 Livestock Asst.: 1 post since 17-01-2009 2 posts since 31-03-2010
v)	Funds released during the year(2013-14)	72,0000 (RE 18.1 Lakh)
vi)	Previous balance	6,66,554
vii)	Funds utilized	17,34,618
viii)	Closing balance	12,33,05.5
ix)	Remarks of PC	The University has not been able to fulfill posts for the project. However sufficient staff was made available on contract. Provision of SR, SRA and SRF have been made in XII Plan to strengthen this Unit. The salary is to be paid from operational cost of the project. New staffing pattern has been proposed in XII plan so as to provide qualified staff for quality implementation of the project.

BE-RE-Expenditure 2013-14 PC Units

Unit	Allocation as per BE	Allocation as per RE	Expendi-ture	Balance	Percent Expenditure as per BE	Percent Expenditure as per RE
1. PC Unit						
Salary	0.00	0.00	0.00	0.00	0	0
T.A.	3.00	2.03	1.88	0.15	62.7	92.6
Rec. Cont.	8.00	2.00	1.46	0.54	18.3	73.0
HRD	1.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	3.00	1.00	0.00	1.00	0.0	0.0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*15.50*	*5.03*	*3.34*	*1.69*	*21.5*	*66.4*
2. JAMUNAPARI UNIT						
Salary	0.00	0.00	0.00	0.00	0	0
T.A.	1.50	0.22	0.11	0.11	7.3	50.0
Rec. Cont.	15.00	6.00	4.76	1.24	31.7	79.3
HRD	2.00	0.00	0.00	0.00	0.0	0
Equipment & Furniture	1.00	0.00	0.00	0.00	0.0	0
Works	5.00	0.00	0.00	0.00	0.0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*24.50*	*6.22*	*4.87*	*1.35*	*19.9*	*78.3*
3. BARBARI UNIT						
Salary	0.00	0.00	0.00	0.00	0	0
T.A.	1.50	0.25	0.13	0.12	8.7	52.0
Rec. Cont.	15.00	6.00	4.52	1.48	30.1	75.3
HRD	2.00	0.00	0.00	0.00	0.0	0
Equipment & Furniture	1.00	0.00	0.00	0.00	0.0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*19.50*	*6.25*	*4.65*	*1.60*	*23.8*	*74.4*
4. CSWRI AVIKANAGAR						
Salary	0.00	0.00	0.00	0.00	0	0
T.A.	1.20	1.00	0.25	0.75	20.8	25.0
Rec. Cont.	14.00	10.80	10.17	0.63	72.6	94.2
HRD	0.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*15.70*	*11.80*	*10.42*	*1.38*	*66.4*	*88.3*
5. MARWARI BIKANER						
Salary	22.00	11.00	5.15	5.85	23.4	46.8
T.A.	1.20	1.00	0.34	0.66	28.3	34.0
Rec. Cont.	5.00	12.54	8.00	4.54	160.0	63.8
HRD	0.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*28.70*	*24.54*	*13.49*	*11.05*	*47.0*	*55.0*

6. BLACK BENGAL, KOLKATA

Salary	22.00	16.00	6.93	9.07	31.5	43.3
T.A.	1.20	1.00	0.72	0.28	60.0	72.0
Rec. Cont.	5.00	8.00	5.54	2.46	110.8	69.3
HRD	0.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*28.70*	*25.00*	*13.19*	*11.81*	*46.0*	*52.8*

7.GANJAM, BHUVANESHWAR

Salary	21.00	16.00	4.00	12.00	19.0	25.0
T.A.	1.20	1.00	0.50	0.50	41.7	50.0
Rec. Cont.	5.00	8.00	6.00	2.00	120.0	75.0
HRD	0.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*27.70*	*25.00*	*10.50*	*14.50*	*37.9*	*42.0*

8.SANGAMNERI, RAHURI

Salary	22.00	26.50	26.95	-0.45	122.5	101.7
T.A.	1.20	1.00	0.55	0.45	45.8	55.0
Rec. Cont.	5.00	8.00	8.00	0.00	160.0	100.0
HRD	0.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*28.70*	*35.50*	*35.50*	*0.00*	*123.7*	*100.0*

9.SURTI, NAVSARI

Salary	15.00	9.00	6.15	2.85	41.0	68.3
T.A.	1.20	1.00	0.00	1.00	0.0	0.0
Rec. Cont.	5.00	8.00	16.00	-8.00	320.0	200.0
HRD	0.50	0.10	0.00	0.10	0.0	0.0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*21.70*	*18.10*	*22.15*	*-4.05*	*102.1*	*122.4*

10.MALABARI, TRICHUR

Salary	21.00	18.00	16.00	2.00	76.2	88.9
T.A.	1.20	1.00	0.61	0.39	50.8	61.0
Rec. Cont.	5.00	6.00	4.62	1.38	92.4	77.0
HRD	0.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*27.70*	*25.00*	*21.23*	*3.77*	*76.6*	*84.9*

11.SIROHI, UDAIPUR

Salary	21.00	16.50	16.00	0.50	76.2	97.0
T.A.	1.00	1.00	0.12	0.88	12.0	12.0
Rec. Cont.	5.00	8.50	8.00	0.50	160.0	94.1
HRD	0.50	0.10	0.05	0.05	10.0	50.0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*27.50*	*26.10*	*24.17*	*1.93*	*87.9*	*92.6*

12.ASSAM, GUWAHATI

Salary	0.00	0.00	0.00	0.00	0	0
T.A.	2.00	1.00	0.59	0.41	29.5	59.0
Rec. Cont.	25.00	21.40	19.89	1.51	79.6	92.9
HRD	3.00	0.10	0.00	0.10	0.0	0.0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*30.00*	*22.50*	*20.48*	*2.02*	*68.3*	*91.0*

13. BLACK BENGAL, RANCHI

Salary	0.00	0.00	0.00	0.00	0	0
T.A.	1.20	1.00	0.86	0.14	71.7	86.0
Rec. Cont.	18.00	15.00	14.69	0.31	81.6	97.9
HRD	0.50	0.10	0.00	0.10	0.0	0.0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*19.70*	*16.10*	*15.55*	*0.55*	*78.9*	*96.6*

14.GADDI, PALAMPUR

Salary	11.00	10.00	10.67	-0.67	97.0	106.7
T.A.	1.20	1.00	0.95	0.05	79.2	95.0
Rec. Cont.	10.00	10.00	10.49	-0.49	104.9	104.9
HRD	0.50	0.00	0.00	0.00	0.0	0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*22.70*	*21.00*	*22.11*	*-1.11*	*97.4*	*105.3*

15.OSMANABADI, PHALTAN

Salary	0.00	0.00	0.00	0.00	0	0
T.A.	1.20	1.00	1.20	-0.20	100.0	120.0
Rec. Cont.	20.00	20.76	20.16	0.60	100.8	97.1
HRD	0.50	0.10	0.10	0.00	20.0	100.0
Equipment & Furniture	0.00	0.00	0.00	0.00	0	0
Works	0.00	0.00	0.00	0.00	0	0
Livestock	0.00	0.00	0.00	0.00	0	0
Total	*21.70*	*21.86*	*21.46*	*0.40*	*98.9*	*98.2*

Total AICRP (G)	BE Alloc.	RE Alloc.	Expenditure	Balance	Percent Expenditure as per BE	Percent Expenditure as per RE
Salary	155.0	123	91.9	31.2	59.3	74.7
T.A.	21.0	14.5	8.8	5.7	42.0	60.8
Rec. Cont.	160.0	151	142.3	8.7	88.9	94.2
HRD & Other	14.0	0.5	0.2	0.4	1.1	30.0
Equipment	5.0	1	0.0	1.0	0.0	0.0
Works	5.0	0	0.0	0.0	0.0	0
Livestock	0.0	0	0.0	0.0	0	0
Total	360.0	290	243.1	46.9	67.5	83.8