Livestock Production Management

Profile:

Department of Livestock Production Management is one of the Animal Sciences departments of Veterinary College. This department is primarily involved in undergraduate and post graduate teaching. Since its inception, offers undergraduate and post graduate courses at Veterinary College as well as other colleges of this university. Presently this department offers five under-graduate courses (including one course from Department of Veterinary Pathology and two courses from Department of Veterinary Medicine in collaboration) and twenty five post-graduate courses of Livestock Production Management. Along with teaching this department is also involved in research and extension activities.

Faculties:

Sr. No.	Name with photograph	Designation	Phone (O)	Cell No	Inter Com No.	E-Mail
1	Dr. K. N. Wadhwani 	Professor and Head	02692-263685	8780964773	918	knwadhwani@aau.in
2	Dr. R. J. Modi 	Assistant Professor	02692-263685	9427560085	917	rjmodi@aau.in
3	Dr. M. M. Islam 	Assistant Professor	02692-263685	7878727966	920	mmislam@aau.in drislam37@gmail.com
4	Dr. N. R. Patel 	Assistant Professor	02692-263685	9428072388	917	patelnitin2076@aau.in patelnitin2076@gmail.com

Major Activities:

I. Teaching

Instructional Livestock Farm Complex (ILFC) is the part of this department where students get intensive skill oriented practical training apart from theory classes. This department is pioneer in India in the establishment of Livestock Farm Complex (previously known as Instructional Livestock Farm Complex) with the financial assistance from ICAR for imparting practical training to students. The farm has different livestock species and breeds viz; **(a) Cattle unit** (Kankrej, Gir, Sahiwal, Tharparkar, Rathi & HF x Kankrej crossbred) **(b) Buffalo unit** (Surti) **(c) Sheep unit** (Marwari, Patanwadi, Dumma, Deccani, Avikalin, Magra and Merino x Patanwadi crossbred) **(d) Goat unit** (Zalawadi, Kutchhi, Sangamneri & Surti) **(e) Equine unit** (Kathiawadi horses) **(f) Rabbit & guinea pig unit. (g). Fodder production unit** with 11 hectares of land. The LFC generates a sizeable income of 14 to 15 lacks per annum.

A. U. G. Teaching: Following are the courses offered by this department at undergraduate level

New VCI: Livestock Production Management- Paper I & II, Livestock Farm Practices.
Old VCI: VPP- 322, VMD-512 and VMD-513

B. P. G. Teaching: Following are the courses offered by this department at MVSc and PhD level

MVSc Courses offered: LPM-601, LPM-602, LPM-603, LPM-604, LPM-605, LPM-606, LPM-607, LPM-608, LPM-609, LPM-610, LPM-611, LPM-612, LPM-613, LPM-691 and LPM-699

PhD Courses offered: LPM-701, LPM-702, LPM-703, LPM-704, LPM-705, LPM-706, LPM-707, LPM-791, LPM-792 and LPM-799

II. Research

Along with U.G. & P.G. teaching this department is involved in research activities. The department is also involved in publication of the research outcomes and other publications for scientific and farming community.

A. Research Projects Completed (No., Title, Agency, Period, Budget Outlay, PI/Co-I)

Sr. No	Title of the project	Agency	Period	Budget (Lakh)	Name of PI	Name of CO-PI
1	Development of Economic Feeding System for Meat Production from Sheep and Goats Native of Gujarat State and their Crosses using Non-Conventional Feeds.	ICAR	1992-94	3.25	Dr. S. Parnerkar	Dr. A. M. Patel Dr. K. N. Wadhwani Dr. P. R. Pandya
2	Draftability of Aged bullocks of Gujarat State	Other	1997-98	8.00	Dr. A. M. Patel	Dr. A. J. Pandya Dr. K. N. Wadhwani Dr. S. V. Shah Dr. M. M. Trivedi

3	Sustainable high production of Indigenous and crossbred cattle and buffaloes in rural households under sugarcane based production system**. (Lead center).**	NATP	2000-03	116.00	Dr. A. M. Patel	Dr. S. V. Shah Dr.K.N. Wadhwani Dr. M. M. Trivedi Dr. A. J. Pandya
4	Establishment of elite nuclear flock of 100 Marwari goats at Godhara/Dahod.	Plan	2008-12	104.00	Dr. A. M. Patel/ Dr K.N. Wadhwani	Dr. K.N. Wadhwani
5	Draft Power Generation by Camel and Evaluation of Medicinal value of Kachchhi Camel Milk.	Other	2010-12	15.00	Dr. K. N. Wadhwani	Dr. D. N. Rank Dr. S. K. Bhavsar Dr. K. D. Aparnathi Dr. C. G. Joshi Dr. J. S. Arya Dr. M. M. Trivedi Dr. A. B. Patel

B. Research Projects On going (No., Title, Agency, Period, Budget Outlay, PI/Co-I)

Sr. No	Title of the project	Agency	Period	Budget outlay (Lakh)	Name of PI	Name of CO-PI
1	Strengthening of Entrepreneur program as per VCI (2008) at Veterinary College, Anand	Plan	Continue	135.00	Dr. K. N. Wadhwani	Dr. R. J. Modi Dr. M. M. Islam
2	Entrepreneurship oriented male weaner goat rearing and selling unit	ICAR	Continue	54.17	Dr. K. N. Wadhwani	Dr. R. J. Modi Dr. M. M. Islam Dr. Y. G. Patel

C. Number of M.V.Sc. & Ph.D. degrees awarded

- MVSc: 74
- PhD: 24

D. Research Publications (No.)

Research articles:

- National Journal: 211
- International journals: 21

E. Research Recommendations (For Scientific / Farmers Community; Year wise; Text)

1972-82:

1. Jersey x Kankrej crossbred heifers should be bred at 225 kg body weight at 14 - 15 months of age. While, HF x Kankrej heifers should be bred at 265 kg body weight at 14 - 15 months of age.
2. Kankrej heifers should be bred by semen of Jersey bulls, but not of HF bulls to avoid dystokia. Cows be bred with either HF or Jersey bulls.
3. Jersey x Kankrej and HF x Kankrej cross breds are well adapted to Gujarat Agro-climatic conditions. However, the heat tolerance of HF x K is lower than J x K animals.
4. The growth rate of HF x K cross is significantly higher and also consume more feed than J x K calves.
5. Jersey x Kankrej crossbred cows give 47% more milk and HF x Kankrej give 84% more milk than those of Kankrej cows.

1983:

6. Maintain cross bred calves under strict hygenic condition, if not, increases the calf mortality.
7. One should provide shed and follow bath to crossbred animals to minimize heat load.
8. Adopt night feeding to crossbreds during summer months.

1996:

9. Complete feeds with 30% wheat straw and 20% *Prosopis juliflora* pods can be advantageously used for feeding of growing crossbred without any adverse effect on growth. It is economical than the conventional system of feeding.

1997:

10. The supplementation of creep mixture in addition to dam's milk, dry and green fodder improves growth performance of pre-weaned lambs. The lamb growth on non-conventional creep Mixture-I comprising of mango seed kernel 15 per cent, babul pods chuni 17 per cent and *Prosopis juliflora* pods 20 per cent **or** Mixture-II comprising of mango seed kernel 20 per cent, babul pods chuni 19 per cent, *Prosopis juliflora* pods 23 per cent, *Cassia tora* seeds 10 per cent and corn steep liquor 15 per cent are economically advantageous.
11. The ration comprising of non-conventional concentrate mixture (mango seed kernel 25 per cent, *Prosopis juliflora* pods 25 per cent, babul pods chuni 15 per cent, *Cassia tora* seeds 6%, Urea 1% and corn steep liquor 15 per cent plus mature pasture grass and green NB-21 fodder (200 g/head/day) can be used for economic mutton production from weaner lambs.
12. The complete feed comprising of non-conventional concentrate mixture and untreated/urea treated wheat straws have potential to serve as economical maintenance and growth rations for sheep/goats.

1998 :

13. Feeding of special concentrate to pregnant ewes and ewes in milk as per ICAR (1985) feeding standard and suckling a lamb up to 140 days of age along with feeding of creep mixture either (a) conventional, Maize 38%, GNC 25%, Rice polish 24%, Molasses 10% and Mineral mixture 3% or (b) Unconventional, GNC 10%, Azolla 12.5%, *Prosopis juliflora* pods 20%, Acasia pods 24.5%, corn steep liquor 10%, Mineral mixture 3%

resulted into 17.4 kg body weight in Patanwadi lambs, 18.3 kg in Marwari lambs and 29.9 kg in Merinox Patanwari lambs.

14. The non-conventional creep mixture comprising of groundnut cake (10 per cent), sun dried ground water fern Azolla (12.5 per cent), *Prosopis Juliflora* Pod (20 per cent), Babul pods chuni (24.5 per cent), Mango seed kernel (10 per cent), Corn steep liquor (10 per cent), Molasses (10 per cent) and Mineral mixture (3 per cent) can replace conventional creep mixture comprising of Maize (38 per cent), Groundnut cake (25 per cent), Rice polish (24 per cent), Molasses (10 per cent) and Mineral mixture (3 per cent) for rearing of preweaned lambs of Patanwadi, Marwari and Merino x Patanwadi for mutton production.

15. The total mixed ration comprising of Babul pods chuni (10 per cent), *Prosopis juliflora* pods (10 per cent), Caged layer droppings (10 per cent), Corn steep liquor (10 per cent) and Jaggery solution (Jaggery 6.5 kg + 3.5 kg water), Cassia tora seeds (7 per cent), Mineral mixture (3 per cent) and Urea treated wheat straw (40 per cent) can be fed without any adverse effect on growth with 34 per cent higher return over feed cost for rearing weaned lambs for mutton production under feed lot system.

1999:

16. Rearing of Patanwadi and Merino x Patanwadi weaner lambs for mutton production under feedlot on total mixed rations comprising of 4 per cent urea treated wheat straw (35 kg) and conventional (20 kg) each of maize and GN cake, 12 kg rice polish, 10 kg molasses and 3 kg mineral mixture) **or** non conventional (10 kg each of GN cake and sun dried azolla, 25 kg of *Prosopis juliflora* pods, 7 kg corn steep liquor, 10 kg molasses and 3 kg mineral mixture) concentrate mixture, results in better growth as compared to that reported for semi-intensive system without any adverse effect. The return over feed cost is higher by 22 percentage units when nonconventional mixture is used.

17. The crossbred bullocks are at par with Kankrej for hp generation (0.62 hp), speed (4 kh/hr) and stride (1.54 mt) length. One crossbred or Kankrej bullock to a pnumatic tyred cart (420 kg) satisfactorily carried 900 to 1180 kg net pay load on farm road and a pair, ploughs and planks 0.7 hac per 6 hrs of a day. A rest of 45 minutes after 3 hrs of continuous work normalizes the physiological responses. Hence crossbred bullocks are good adaptive to middle Gujarat climate.

2000:

For Farming Community:

18. The supplementation of creep mixture in addition to dam's milk and limited Pasture grass and green fodder improves growth performance of pre-weaned lambs. The feeding of Non-conventional creep ration I (NC-1) comprising of Maize 25 parts, Groundnut cake 12 parts. Corn steep liquor 15 parts, Mango seed kernel 15 parts, P.J. Pods 20 parts, Molases 10 parts and Mineral mixture 3 parts reduces the cost of feeding of pre-weaned lambs by 23.57% with 51.91% higher growth rate than those lambs on conventional ration under feedlot production system.

19. The ration comprising of total non-conventional creep mixture (P. J. Pods. 22 kg. Babul Pods chuni 22 kg. Mango seed kernel – 19 kg. Boiled C*assia tora* seeds 9 kg. Corn steep liquor- 15 kg, Jaggery 6.5 kg dissolved in 3.5 kg water and mineral mixture 3 kg), *ad libitum* mature pasture grass and limited quantity of green NB-21fodder (200 g) used for rearing preweaned lambs of Marwari, Patanwadi and Merinox Patanwadi produced

parallel growth responses, sizeable reduction in feed cost (28.74%) and significant increase in return over feed cost (8%) as compared to lambs reared on conventional creep mixture based ration.

For Scientific Community:

20. The feeding of ewes (Marwari, Patanwadi and Merino x Patanwadi) according to ICAR (1985) feeding standard during gestation and lactation was found beneficial as compared to feeding as per standard only during lactation in terms of better body Patanwadi lambs produced parallel growth responses, sizable reduction in feed cost (28.74%) and significant increase in return over feed cost (8%) as compared to lambs reared on conventional creep mixture based ration.

21. The feeding of ewes (Marwari, Patanwadi and Merino x Patanwadi) according to ICAR (1985) feeding standard during gestation and lactation results in terms of better body condition score higher body weight at lambing, increased lactation milk yield (20.28%) and higher birth weight and subsequent growth rate of their lambs.

22. For rearing weaner lambs under intensive production system on total mixed rations on individual feeding had any beneficial effect over group feeding.

2001:

23. Rearing of Patanwadi, Marwari and Merino X Patanwadi weaner lambs under intensive production system on total mixed ration comprising 35% urea treated wheat straw and conventional (22% GN cake and 15% each of maize and rice polish, 10% molasses and 3% mineral mixture) **or** non-conventional (5% GN cake, 10% each of rice polish and Azolla, 15% P.J. pods and 12% corn steep liquor, 10% molasses and 3% mineral mixtures) concentrate mixture exhibited similar growth performance and carcass traits. 48% increase in return over feed cost was obtained with non-conventional concentrate based total mixed ration than that obtained on conventional one.

24. Processing of Waterfern (Azolla piñata) for ruminant feeding include procurement from village ponds → sun drying on pucca floor to around 90% dry matter hand picking of snail, shells, thorns, weeds and leaves of other aquatic plants → → breaking of lumps → sieving → and storage in gunny bags.

25. Feeding the ration comprising of total non-conventional creep mixture (22% *Prosopis juliflora* pods, 22% babul pods chuni, 19% Mango seed kernel, 9% boiled Cassia tora seeds, 15% corn steep liquor, 10% jaggery solution i.e. 6.5 kg jaggery + 3.5 kg water and 3% mineral mixtures), *ad libitum* mature pasture grass and limited quantity of green NB_{21} fodder (200 g) to pre-weaned lambs of Marwari, Patanwadi and Merino X Patanwadi resulted into comparable growth and 52% more return over feed cost as compared to those on conventional creep mixture.

26. The feeding of non-conventional creep ration I (NC-I) comprising of maize 25 parts, GN cake 12 parts, corn steep liquor 15 parts, mango seed kernel 15 parts, PJ pods 20 parts, molasses 10 parts and mineral mixture 3 parts to pre-weaned native and crossbred lambs resulted in 51.91% higher growth rate and 23.57% saving in feed cost vis-à-vis conventional ration.

2005:

27. The broiler birds can be reared economically on rice husk litter material by feeding 2879 (BS) - 2941 (BF) ME energy and 22.12% (BS) – 19.87% (BF) protein ration to harvest 207% return over feed cost.

28. The average Animal Housing Index on 28 point scale in middle and south Gujarat was 14.38 i.e. nearly 50% comfort. At present more than 75% farmers provide roof of animal houses at less height (5-6 feet) with no manger and uneven earthen floor. To improve the micro-climate of rural animal houses, the height of the roof should be 8 – 10 feet, provision of manger and slope even earthen / brick on edge floor.
29. The body condition scores (BCS) of high milk producer cows and buffaloes ranged from 2.0 to 4.5 cm on 5 point scale. While the desirable BCS is 3.0 to 3.5. More than 85% of the farmers were not feeding mineral mixture and their animals showed energy deficit to high producers. Thus, balanced mineral mixture daily @ 35 to 50 grams per cow / buffalo and one kilogram grain bharda or cake should be fed to improve both milk production and reproductive efficiency.
30. During the year, the availability of green sugarcane tops is for 5 months. i.e. November to March. It contains 34.24% moisture, 5.97% CP, 1.55% EE, 34.49% CF, 52.29% NFE and 5.7% Ash. While dry sugarcane tops contains moisture 5.5%, CP 5.42%, EE 1.5, CF 35.5, NFE 51.56 and Ash 6%. The sugarcane tops can be fed safely 15 – 20 kg daily to medium to high producers for 5 months without any adverse effect on milk yield, BCS, Hemoglobin and Blood sugar.

2008

31. Shelter through Asbestos/Agronet (75%) reduces the thermal stress, water requirement (10-29%) and increase dry matter requirement (4-7%) of adult Marwari and Patanwadi sheep.

2012

32. Camel milk contains very negligible quantity of saturated fatty acid (Caprylic Acid, Capric Acid and Lauric Acid) but higher in unsaturated fatty acid (Linoleic Acid- 44% and Linolenic Acid -53 %), Mineral (Potassium-13%, Iron-68 % and Zinc-80%) and Vitamin C-80 % than Surti goat milk.
33. Kachchhi camel milk contains comparatively higher unsaturated fatty acids (Palmitoleic Acid 7.31%, Linoleic Acid- 0.78% and Linolenic Acid 0.57%), Minerals (Iron +0.30 ppm and Zinc +2.64 ppm) and Vitamin C (+5.88mg/100ml) than goat milk.
34. Pineapple flavored medium fat ice cream (6% milk fat, 11% MSNF, 15% sugar, 1.5% whey protein concentrate, 0.2% sodium alginate and 0.15% glycero monostearate) can be prepared from camel milk which has comparable acceptability to regular ice cream (10% fat)
35. Kachchhi camel has low genetic variability as revealed by low on served and expected heterozygosity (Ho= 0.364 and He= 0.421) and low inbreeding coefficient (F_{IS} = 0.1027) based on camel specific set of 16 microsatellite markers.

2013

36. Kachchhi camel generates 0.58 and 0.69 horsepower under 2000 and 2500kg payload as compared to 0.50 at 1500kg payload during work.
37. The speed (m/sec.) and stride length(m) of Kachchhi camel remains same under 2000 and 2500 kg payloads in **work (w) – rest (R) cycle [(1h(W)-15 min (R) -1h (W)-15 min (R)- 1h(W)- 1h(R)- 1hr(W)-15 min (R)- 1h(W)-15 min (R)- 1h(W)]**
38. GPX and TBARS biomarkers levels Kachchhi camel remain high during hot and humid season as compared to summer and winter season suggestive of stress the animal.

39. It is advisable to give 1 hour rest to Kachchhi camels after every 2 hours work under 2500 kg payload.

કચ્છી ઉટ ને ૨૫૦૦ કિલો ગ્રામ વજન હેઠળ દર ૨ કલાક કામ પછી ૧ કલાક આરામ આપવો હિતાવહ છે.

2015

40. Marwari and Patanwadi hoggets can be maintained on 2.0 litres of water, daily.

આથી ભલામણ કરવામાં આવે છે કે મારવાડી અને પાટણવાડી ઘેટાંઓનાં ઉછરતા બચ્ચાઓને દૈનીક ૨.૦ લીટર પાણી પર નિભાવી શકાય છે.

III. Extension

A. Refresher Training Courses / Summer-Winter Schools conducted: NIL

B. Seminar/Symposia/Conference/Workshop organized: 6

C. Diagnostic Services / Clinical Camps/Farmers' advisory services/Ambulatory Clinics/Vaccination camps: 2

D. NSS Camps/ Krishi Mahotsav/ Pashupalan Shibirs/Radio-TV Talks Delivered/Exhibitions/Farmers' meet-day/Kisan Call Center/Field Visits

TV and radio talks: 12

E. Expert services to State Government/Co-op. dairies/Other agencies /NGOs: 50

F. No. of Publications of Popular articles /Books /Booklets /Pamphlets /Leaflets/ Souvenir/Compendium/ chapters/ Lab Manuals / Training Manuals etc.

Popular articles

English: 16

Gujarati: 125

Books/Booklets: 20

Leaflets: 4

Folders: 4

Gujrati vishvakosh: 8

Scientific abstracts

National: 230

International: 24

Souvenir/Compendium: 6

Documentary Film: 3

Lab manuals: 6

G. Visitors: More than 100 every year

<u>Achievements</u>:

A. Awards/Honours/Recognitions/Appreciations

1. **Sardar Patel Agricultural Research Award – Animal Science for the Year – 1997 IInd Prize with certificates and a cash prize of Rs. 25,000/-**
   Team Leaders: Dr. S. Parnerkar and Dr. Ashok M. Patel
   Co-workers: Dr. K.N.Wadhwani, Dr. L. H. Saiyed, Dr. P. R. Pandya and Dr. K. S. Patel. For the **development of Economic Feeding System for Meat Production from Sheep and Goats Native of Gujarat State and their Crosses using Non-Conventional Feeds** during 1991 – 94.

2. Prof. J. P. Trivedi Prerit Hariom Ashram Award (Animal Husbandry) Year-1996 of Ministry of Agriculture and Co-operation Govt. of Gujarat For the research on "**Feedlot performance – Economic ration for Sheep & Goat."**
   Team: Dr. S. Parnerkar, Dr. A. M. Patel, Dr. K. N. Wadhwani, Dr. P. R. Pandya and Dr. L. H. Saiyed.
3. Fellow National Award to Dr. A. M. Patel and Dr. K. N. Wadhwani by Indian Society of Animal Production Management (ISAPM).
4. Y. D. Padheriya, Manisha Patel, K. N. Wadhwani and C. G. Joshi has been awarded 2nd prize in poster presentation on Status of Oxidative Stress Biomarkers of Kachchhi camel during exercise during National Seminar at NDRI, Karnal between 28th to 30th January, 2013.
5. D. N. Singh, K. N. Wadhwani and A. M. Patel has been awarded 2nd prize in poster presentation on Comfortable Housing System for Indian Sheep during Intense Summer Season during National Seminar at AAU, Anand between 28th to 30th January, 2014.
6. Neelam Gupta, A. V. Khanvilkar, H. Wasim, Y. D. Padheriya and K. N. Wadhwani has been awarded Dr. N. S. R. Sastry Young Scientist Award during National Seminar at AAU, Anand between 28th to 30th January, 2014.
7. K. N. Wadhwani, B. M. Mehta and K. D. Aparnathi has been awarded 2nd prize in poster presentation on Nutrients Composition of Kachchhi Camel Milk during National Seminar at AAU, Anand between 28th to 30th January, 2014.
8. Y. D. Padheriya, M. M. Islam and K. N. Wadhwani has been awarded 2nd prize in oral presentation on Physiological Responses of Kachchhi Camel during Exercise during National Seminar at AAU, Anand between 28th to 30th January, 2014.
9. Nitin Patel, R. J. Modi, M. M. Islam and K. N. Wadhwani has been awarded 1st prize in oral presentation on Comparative body weight of indigenous sheep breeds on dehydration and rehydration in middle Gujarat during summer season during ISAPM International Seminar at Hyderabad 28th to 31st January, 2016.
10. R. P. Patel, R. J. Modi, M.M. Islam, Y. G. Patel and K. N. Wadhwani has been awarded 2nd prize in oral presentation on Comparative body weight of indigenous sheep on water deprivation during summer season during ISAPM National Conference at SDAU, SK Nagar, 11-13 April, 2018.
11. Aruna D. Patel, M. M. Islam, R. J. Modi, N. R. Patel, Y. G. Patel and K. N. Wadhwani has been awarded 1st prize in oral presentation on Production performance of HFxK crossbred cows during different generations under intensive production system during ISAPM National Conference at SDAU, SK Nagar, 11-13 April, 2018.

B. Assignments as Subject Expert / Member (Selection Committee/Advisory Board): 50

C. Advanced Instrumentation / Lab Facilities: CPCSEA approved Small Animal House

D. Patents filed / Technology Developed: Development of Economic Feeding System for Meat Production from Sheep and Goats Native of Gujarat State and their Crosses using Non-Conventional Feeds

E. Other Recognitions (SRC/NSS/AGRESCO Convener/Convener and member in other committees/ Chairman/Co-chairman/Rapporteur/Chief guest/ Hostel Rector etc.) : 50

Future Thrust Areas: Feed and water scarcity management for small ruminants. Economic sheep and goats rearing under different feeding systems. Behavioral (Ethology) studies of small and large ruminants under different farm management during different seasons under era of climate change.

Snaps documenting the significant activities of Department

A. Visit of Hon. Former Chief Minister, Gujarat and Present Hon. Prime Minister of India

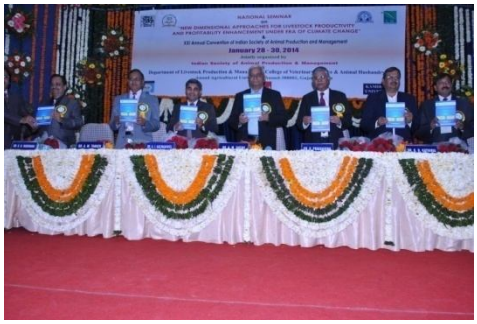
B. Visit of Former Hon. Agriculture Minister Shri. Bhupendrasinh Chudasama

C. Visit of overseas students (Pennsylvania)

D. Seminars Organized

Camel Seminar at Bhuj, 2011

Interactive Seminar with Foreign Scientists, 2012



ISAPM National Seminar, Golden Jubilee Year (28-30 Jan, 2014)

Camel Seminar, Golden Jubilee Year (30th Dec, 2014)

E. Lifetime Achievement Award by ISAPM- Dr. A. D. Dave, Retd. Prof and Head

F. Felicitation of Professor and Head's

Veterinary College, AAU, Anand

Indian Society Animal Production Management