Annual Report
2015-16









Guru Angad Dev Veterinary and Animal Sciences University

ANNUAL REPORT
2015-16
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana

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2015-16



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

PREFACE

The Guru Angad Dev Veterinary and Animal Sciences University has further stepped up its contributions to scientific knowledge and developmental activities. It has made a mark at the national and international levels. Memoranda of Understanding (MoU) were signed with the University of Sydney, Australia and with Fresh Water Fisheries Research Centre (FFRC), Wuxi, Jiangsu Province, Republic of China for collaboration in work on animal health and production. Competitive International grants were earned for research in 'One Health Programme' focusing on animal and public health.

Significant efforts were made in capacity building through exchange of faculty and students with International institutes of repute. Seven young scientists were trained in the USA, Canada, Australia and Belgium in the areas of Clinical and Surgical Interventions, Disease Diagnosis, Extension Education, Value Addition to Livestock Products and Fisheries. Our two Centers of Advanced Faculty Training continued to provide "Hands on Training" in several specialized procedures in Veterinary Surgery and Animal Reproduction to scientists from various Veterinary Colleges and ICAR institutions. Taking lead at the National level, the university conducted 28 training and two National Conferences in various disciplines. Its on-going programmes on control of zoonosis in collaboration with the University of Saskatchewan, Saskatoon, Canada, Free University Berlin, Germany; Canadian Food Inspection Agency, Canada; University of Sydney, Australia and Royal Veterinary College, University of London and London School of Hygiene & Tropical Medicine, UK turned out to be a great success. International students (n=18) and faculty (n=15) from these countries visited GADVASU for exchange of knowledge and experiences. In turn, nine students of GADVASU attended various exchange programmes in universities abroad.



GADVASU's dairy animal genetic improvement programme attained new heights with 8,854.5 kg lactation yield and 47 kg peak yield in crossbred cattle. Age at first calving is also reduced to 28.3 months. Similarly, we now have buffaloes with 4,321 kg lactation yield and 22.05 kg peak yield. One of our buffalo bulls is among the top ranks in ICAR Network Project on Buffalo Improvement. Embryo Transfer Technology is now being applied at the field level for the benefit of farmers.

The Multispecialty Veterinary Hospital on the University Campus has come up as one of the best Animal Health Facilities in India, where around 55000 referred cases were treated. The State-of the-Art Animal Diagnostic Laboratory and a Unit for Cataract Surgery are the noteworthy developments. Standardization of technology for production of high value Pangas catfish and brackish water

shrimp (Vannamei) have come up as new hopes for profitability and livelihood security.

Significant focus has been on the development of Value Added Products to enhance profitability from dairy, poultry and fishery enterprises. Farmers have been trained in entrepreneurship ventures. Milk adulteration kit, a Pinni making machine and a phase changing material based milk chiller were developed and transferred for commercialization.

The extension wing of the university has been in full swing to disseminate technologies to farmers through several innovative initiatives. In turn, the trained farmers act as ambassadors of GADVASU for horizontal dissemination of technologies. University students and NCC cadets continued to excel in extracurricular activities and brought laurels. Achievements made by the University are the outcome of our rapport with the farmers and their overwhelming interests in our innovations. The University would continue to endeavor for further improving its usefulness to the cause of the society.



Amarjit Singh Nanda
Vice Chancellor

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EXECUTIVE SUMMARY



Guru Angad Dev Veterinary and Animal Sciences University was established on 9th August, 2005 at Ludhiana and started functioning from 21st April, 2006. The university has shown phenomenal growth and has its presence felt at National level. To produce highly efficient and skilled human resource for giving boost to activities of livestock and fishery sectors in Punjab, the university has created College of Fisheries, College of Dairy Science and Technology, School of Animal Biotechnology, and Veterinary Polytechnic. To address the issues of zoonoses, food safety, environmental pollutants, through research and collaboration with various agencies, the university has established School of Public Health and Zoonoses. Three Regional Livestock Research and Training centres at Kaljharani (Bathinda), Talwara (Hoshiarpur) and Booh (Tarn Taran) were established for catering to specific needs of the area. Three Krishi Vigyan Kendras were established each at Tarn Taran, Barnala and Mohali districts of Punjab for technology assessment, refinement and demonstration. The University has received accreditation from Indian Council of Agriculture Research (ICAR) and University Grants Commission (UGC), and has been admitted as a regular member of Association of Indian Universities (AIU).

Financial Report

The university allocated ₹11895.54 lacs during 2015-16 under various schemes/projects which included grant of ₹10612.19 lacs received from various funding agencies, revalidated amount of ₹484.80 lacs and ₹798.55 from income generated under non-plan schemes. Grant received during 2015-16 includes ₹ 10281.34 lacs from State Agencies, ₹1115.3 lacs from ICAR and ₹498.90 lacs from other agencies. The total expenditure for the year 2015-16 was ₹11398.55 lacs which included ₹6736.61 lacs for State NPV Schemes, ₹1.50 lacs for State Plan Schemes, ₹1535.56 lacs for RKVY, ₹1048.67 lacs for ICAR Schemes/ Projects/Development Assistance and ₹2076.21 lacs for other schemes.

Faculty profile

Total present faculty strength in the constituent colleges/institutes of the university is 197, out of which 70 are Professors or equivalent, 11 Associate Professors or equivalent and 116 Assistant Professors or equivalent. About 112 faculty members are working in teaching schemes, 59 in research schemes and 26 in extension schemes. On university basis, 19% faculty is female, 89% faculty holds doctoral degree, 25% faculty is trained from foreign institutes and 59% faculty is from Punjab.

Student profile

The present strength of student in various programmes of constituent colleges is 1045, out of which 57% are enrolled in undergraduate courses, 20% in postgraduate courses, 9% in doctoral programme and 14% in diploma course. The percentage of male and female students in the university is 69% and 31%, respectively.

Teaching

Admission in various undergraduate programmes is done strictly on the basis of Common Entrance Test (CET) conducted by the university. The total number of students admitted for the session 2015-16 was 347 which included 93 in B.V.Sc. & A.H., 23 in B.F.Sc., 30 in B. Tech. (Dairy Technology), 100 in M.V.Sc./M. Sc./ M.F.Sc., 29 in Ph.D programme and 72 in Diploma in Veterinary Science and Health Technology. A total of 328 students successfully completed their degrees in different disciplines (129 – B.V.Sc. & A.H., 14-B.FSc., 26 – B.Tech, 82 – M.V.Sc./M.F.Sc./M.Sc./M.Tech, 23 – Ph.D. and 54 – Diploma). After completion of course work in nine semesters, 75 B.V.Sc. and A.H. students of 2010 Batch registered for six month compulsory internship programme.

All India Study Tour for final year B.V.Sc. and A.H. students (2011 batch) was organized during December 2015 and January 2016. The students visited various veterinary colleges, national institutes, laboratories and wild life sanctuaries at Mumbai, Goa, Bengaluru and Hyderabad. In January 2016, twenty five students of final year B. Tech. (Dairy Technology) programme attended study tour programme and visited dairy plants in Gujarat, Rajasthan and Delhi, as well as SMC College of Dairy Science and Technology, Anand. All India Educational Tour from January 4-20, 2016 was conducted for nine final year students of B.F.Sc.

The university awards merit scholarships to students for academic excellence. During 2015-16, University Merit Scholarship was given to 81 undergraduate, 72 postgraduate and 22 Ph.D students. ICAR Junior Research Fellowship was awarded to 8 M.V.Sc. students, ICAR Senior Research Fellowship to 2 Ph.D students and ICAR NTS Scholarship was given to 7 undergraduate students.

During Republic Day Camp and Prime Minister Rally 2016, three students of College of Veterinary Science participated in various equestrian events and brought laurels to the university by winning two gold medals. The Cadets participated in various activities during 2015-16 like painting competition, declamation, awareness rallies against social evils, Run for Fun for good health, Swach Bharat Abhiyaan and Yoga Day. Also cadets attended Combined Annual Training Camp and appeared in Certificate 'B' examination.

Department of Veterinary Surgery and Radiology conducted a workshop on Advanced Clinical Procedures in Veterinary Practice and 21-day Centre of Advanced Faculty Training (CAFT) courses on "Hands on Training in Specialized Procedures in Veterinary Anaesthesia and Surgery." Also, the Department of Veterinary Gynaecology and Obstetrics organized 21-day CAFT course on "Improving Reproduction Rate in Ruminants by Suitable Reproductive Technologies." Department of Veterinary and Animal Husbandry Extension Education organized first National Conference of Society of Veterinary and Animal Husbandry Extension on "Push to the Livestock Farming through Knowledge Empowerment of the Farmers" and an Animal Husbandry Officers Workshop. School of Public Health and Zoonoses conducted workshops on "Epidemiologic Study Design and Data Analysis, GIS Mapping & Data Analysis for Animal Health and Disease Prioritization and Risk Analysis" in collaboration with University of Sydney, Australia. International School on "One Health: A team Science Approach for the protection of Animal, Human and Environmental Health" was organized in collaboration with University of Saskatchewan, Canada. In addition various departments of the university organised training programmes for field Veterinary Officers and livestock farmers.

Faculty participated in international and national conferences, symposia and workshops and presented research papers. The faculty won several awards and honours, and published about 230 research papers.

Research

Guru Angad Dev Veterinary and Animals Sciences University, Ludhiana is working towards sustainable livestock, dairy and fishery farming for food security and economic prosperity of Punjab state through need-based

and problem-oriented research. During the year 2015-16, a total of 162 research schemes were operational in GADVASU and these schemes were funded by state government (41), ICAR (43), UGC (29), RKVY (3), Revolving Fund Schemes (5), DBT/DST and various other national and international funding agencies (41).

Livestock Farms

Under the ongoing genetic improvement project of crossbred cattle at university herd the maximum 305-day milk yield and peak yield recorded were 8,854.5 kg and 47 kg, respectively in the herd. For Murrah buffalo, the maximum 305-day milk yield and peak yield was 4,321 kg and 22.5 kg, respectively. At university farm, one of the Nili Ravi buffalo produced 2,637 kg milk in 305-day lactation length, with a peak yield of 15.5 kg.

The university hatchery supplied around 20,000 commercial chicks of commercial broiler (IBL-80) in the current financial year. The university is regularly supplying quail eggs and 5-week old dressed to farmers. For broiler rearing, passive cooling strategy with roof shading and gravity flow sprinklers is as an alternate of fan pad mechanical cooling systems to alleviate heat stress.

Feeding strategies for dairy animals and poultry

Rye grass had higher nutritional value with lower methane production as compared to guinea grass. Under cereal brans, wheat bran was considered as the best. Sugar beet pulp could be stored as silage by adding wheat straw @ 5% or wheat straw along with acidic additives. Cinnamon, garlic powder and aloe vera powder can be used as phytobiotic alternatives to antibiotic growth promoters in broilers. Coarse maize feeding to broilers can be used for lowering feed manufacturing cost and to improve their performance.

Meat processing and value addition

Lemon grass oil exhibited antimicrobial activity and can be used to increase shelf life of meat products. Phytoextracts like sapota (*Achras zapota*) powder @ 4% can extend storage life of functional meat products. The process protocol was standardized for designer meat and egg products for health benefit and marketing.

Pesticide toxicity mechanism and acaricide multi-resistance in ticks

In vitro cytotoxicity and oxidative stress potential of aldrin on BALB/c 3T3 mouse fibroblast cells suggested that an increase in lipid peroxidation and decrease in activity of antioxidant defense were responsible for cytotoxicity. Multiple mutations were present in acetylcholinesterase (AChE)-3 gene associated with organophosphate resistance in *Rhipicephalus microplus* (Boophilus) ticks.

Surveillance of toxicities and diseases

The animals inhabiting Buddha Nallah area, Ludhiana district had higher concentrations of heavy metals that lead to detrimental health hazards. In sheep and goat with abortion history, 39.8% were positive for one organism, mixed infections were observed in 27.2%, while 33.01% did not reveal antibodies to any of the agents tested. The prevalence of *Balantidium coli* infection in dairy animals was revealed as 8.09% and infection was marginally higher in buffalo (8.99%), as compared to cattle (7.33%). Regarding prevalence of strongyle infection in equines, about 56% and 46% of surveyed horses and mules, respectively, were positive for small strongyles (Cyathostomes). Amongst large strongyles, highest proportion was recorded for *Strongylus vulgaris* whereas, *S. equinus* was found in least proportion. The possible absence of *Babesia caballi* was demonstrated in both conducive and non-conducive areas of Punjab and *Theileria equi* was demonstrated as the potential agent of equine piroplasmosis in Punjab. During the period under the report, the sero-prevalence of various diseases affecting reproductive tract of pig was also studied. University experts attended 21 disease outbreaks and provided diagnostic services, and treatment to prevent loses and suggested various preventive measures to control such disease outbreaks in future.

Molecular and serological diagnosis of diseases

The diagnostic potential of esxA gene (ESAT-6) and esxB (CFP-10 protein) present in the RD1 region of the genome of *Mycobacterium bovis* was revealed for the diagnosis of bovine tuberculosis. A multiplex PCR assay was developed for Brucella, Leptospira, Listeria and Mycoplasma associated with reproductive disorders in cattle and buffalo. Isolation and molecular characterization of *Brucella abortus* was confimed. Haemorrhagic septicaemia was confirmed by PCR, real time PCR, and by LAMP, and also by isolation of Pasteurella multocida on blood agar. Multi-mycotoxin screening method was employed on feed samples for the detection of different mycotoxins. Rabies Immunogen Detection Assay (RIDA) was more effective test than IHC for detection of rabies.

Clinical interventions

During the report year, the university supplied about 200 mastitis diagnostic kits to the farmers/technical persons. In South West Punjab, fluoride (@ >1ppm) is responsible for causing fluorosis; however, subjecting buffaloes to defluoridated (Nalgonda technique) drinking water for period of 90 day lead to an improvement in general health of fluorotic buffalo. Colour doppler studies in cattle and buffalo revealed significant changes in blood flow characteristics in diseases like diaphragmatic hernia, intestinal obstruction and pericarditis. In clinical cases of cataract in dogs, phacoemulsification technique was used to remove the cataractous lens and foldable PMMA intraocular lens of power +41 D was used with good results. Various prognostic indicators were tested that helped in early diagnosis of equine colic patients fit for surgery and successful surgical treatment.

Enhancing reproductive efficiency

Nuclear Magnetic Resonance investigations of cystic follicular fluid revealed UDP-G as potential biomarkers in cattle suffering from cystic ovarian follicles. Transvaginal ultrasound guided cyst ablation is an alternative to hormones for the treatment of cystic ovarian follicles. Treatment of neat semen with purified seminal plasma heparin binding proteins and a 31kDa protein (IL-6) before cryopreservation minimized cryo-injury. Fertility associated metabolites in crossbred bulls for identification of high fertility bulls indicated that metabolites like citrate, tryptamine, taurine, isoleucine, leucine and asparagines can be used as biomarkers of fertility in breeding bulls.

Animal biotechnology

Sahiwal is considered more heat tolerant than crossbred because at 39°C crossbred cattle was more susceptible to heat stress as it showed comparatively very high HSF-1 expression. To investigate occupational exposures of human and livestock population to organophosphorus pesticides like ethion, it was revealed that there was significant increase in comet tail length (µm) and tail DNA% indicating genotoxic potential of ethion. Bubaline Dicer-I coding sequence was cloned and studied for the first time in world.

Centre for wild life studies and research

Animals of felid family of Chhatbir zoo and Ludhiana zoo were found positive for leptospirosis, *Escherichia coli, Salmonella* and *Mycobacterium avium* subspecies *paratuberculosis* infections. Free ranging wildlife mostly had high infection with coccidian parasites and nematodes although prevalence of cestode (moneizia) was also observed.

Dairy science and technology

A low fat functional dahi combining the nutrient properties of both milk and β-glucan was developed. Excellent consumer preference was recorded for low fat yoghurt ice cream. Nano-technological interventions were developed for the application of phytosterols, a functional lipid, into food matrix. Bottle gourd burfi

was prepared with benefits of bottle gourd being rich in choline, dietary fiber and good source of minerals. The process for pinni making was standardized. Vacuum packaging method was found best for storing and marketing pinni without appreciable quality loss. Probiotic lassi was prepared by inoculating *Streptococcus thermophilus* and *Lactobacillus acidophilus* in heat-treated milk. The process was standardized for fortification of milk with multi-micronutrients (Ca, P and Vitamin D). A kit was developed to detect adulterants like sugar, starch, urea, neutralizers and hydrogen peroxide in milk.

Enhancement of fish productivity

Extruded floating feed (pellets) with 28% crude protein was developed for Pangas catfish, a potential candidate species for diversification and aquaculture productivity enhancement (vertical expansion), which not only supported optimum growth rate but also reduced the feed cost by 30%. Genetically improved farm Tilapia (GIFT) *Oreochromis niloticus* was reared successfully in a pond cage culture system. A new strain of common carp, Amur carp was introduced with an objective to enhance productivity of carp polyculture ponds and acclimatized successfully for rearing under monoculture conditions for biological studies. *Labeo calbasu,* another candidate species introduced last year for diversification, was reared in a periphyton based aquaculture system with over 60% higher growth rate. Breeding and larval rearing of 'Scampi' (*Macrobrachium rosenbergii*), a fresh water prawn, was carried out successfully up to post-larvae stage in artificial brackish water, for the first time in the State. Duckweed (*Lemna minor*) powder incorporated (incorporation level 40%) carp growout diet developed with 27% saving on supplementary feed cost. Feeding Strategies (feeding rate and feeding frequency) standardized for brood stock improvement in terms of weight gain, gonadosonatic index, ova diameter and fecundity in Indian major carp, *Labeo rohita* (Ham).

A model for establishing backyard ornamental fish rearing and breeding unit for livebearer spp. was developed with an average income of Rs. 5,000/month. Various procedures were developed for eco-friendly management of fish processing waste. Meat recovery and biochemical composition of raw/processed shrimp (*Litopenaeus vannamei*), reared in saline waters of Punjab, was analyzed and acceptability value for fried shrimp was found higher than the coated shrimp. The biometric studies revealed substantial scope of rearing brackish water shrimp, *L. vannamei*, in inland saline waters of Punjab. Socioeconomic evaluation of small (<2acres), medium (2-5 acres) and large (>5 acres) fish farmers from different district carried out for data base generation and technical gap analysis. Fish markets surveys conducted for understanding fish procurement systems, marketing channels, marketing methods, storage/preservation, post-harvest losses, waste management, hygiene and consumer safety.

Extension

In order to transfer the new technologies evolved by the university, training courses/programmes were organized for the farmers, field veterinarians and scientists from other universities. In order to disseminate information important to farmers, faculty published about 128 extension publications in various magazines, journals and News papers. The faculty members of different departments delivered 36 TV talks and 55 radio talks on the topics assigned by Directorate of Extension Education. It constitutes a very good medium to educate farmers and is very popular among farmers.

Animal welfare camps (13) were organized in the rural areas of Punjab. Farmers and field functionaries were advised/made aware of recommended animal health practices. The faculty members delivered extension lectures to farmers in collaboration with other animal welfare agencies of state like Department of Animal Husbandry, Fisheries and Dairy Devlopment, Fish Farmer's Development Agencies, Nestle, Smith Klime Beecham and Sind Bank. On these occasions, demonstrations regarding the collection, dispatch and transport of clinical material like blood, mucous discharge and faeces from the animals, correct method of

milking, teat dip, computation of ration, silage making, acaricide drug application and heat detection were carried out for livestock farmers. Training courses and awareness camps were organized by Krishi Vigyan Kendra's and Regional Research and Training Centres of the university.

Two Pashu Palan Melas were organized, each in the months of March and September at the university campus. Various university departments exhibited new technologies /innovations for use in livestock and poultry farming. On this occasion, other government and private agencies involved in animal welfare work also displayed their exhibits of importance to the farmers. To give a push to the livestock farming, GADVASU conferred Chief Minister Award to progressive dairy, poultry and goat farmers of the state.

University provided information services through sale and distribution of the university publications like Package of Practices for Livestock Health Management, Vigyanak Pashu Palan (Monthly Punjabi Magazine), Hand book on Infectious Animal Diseases, Veterinary Punjabi Shabad Kosh, Dairy Farming, Goat Farming in Punjab (English & Punjabi), Fish Farming and GADVASU hand-book.

Library and Networking

The University Library is fully automated in its operations using LSEase (Libsys) Library Management Software. The library provides a single platform to access e-resources through Cybrary at the campus as well as access to about 3500 journals through Consortium for electronic Resources in Agriculture (CeRA). In addition, links were given to various open access electronic information resources. The Library provides facility of Online Public Access Catalogue (OPAC) not only inside the library but throughout the campus vide intranet. The library has established a Campus wide Network connecting all buildings and offices of University with more than 500 access nodes. The internet services are provided throughout the Campus through User base authentication. The networking facility of GADVASU has also been extended to cover hostels using Wi-Fi Technology.

Also, the library is providing data inputs to the National Information System on Agricultural Education Network in India (NISAGENET) and ensuring data inputs to All India Survey on Higher Education (AISHE) portal initiated by the Ministry of Human Resource Development (MHRD) to build a robust database and to assess the correct picture of higher Education in the country.

Sports and Co-curricular activities

A large number of students (both boys and girls) from constituent colleges has shown keen interest in sports activities. The tenth Annual Athletic meet was held on March 15-16, 2016. A sports contingent of 40 athletes participated in 16th All India Inter Agricultural Universities Sports and Games Meet held at Tamil Nadu Agricultural University, Coimbatore from February 22-26, 2016.

Sixth Inter College Youth Festival of GADVASU was successfully conducted from October 31- November 6, 2015. University cultural contingent also participated in Inter University North Zone Youth Festival held at PAU, Ludhiana from January 14-18, 2016, and in All India Agricultural University Youth Festival held at Orrisa from February 1-4, 2016.

The NSS unit of university organized seven day NSS Special Camp with the theme 'Role of Youth in Control of Drug Abuse' from November 20-26, 2015 at Khalsa College of Veterinary and Animal Sciences, Amritsar and a seven day NSS Special Winter Camp with the theme 'Swasth aur Swatchh Bharat' from January 21-27, 2016 at GADVASU campus.

ABOUT THE UNIVERSITY



Guru Angad Dev Veterinary and Animal Sciences University started functioning on 21st April, 2006 at Ludhiana, as per Punjab Act No. 16 of 2005 to serve the society by promoting the livestock production, health and prevention of the diseases through integrated teaching, research and extension programmes. The university has shown phenomenal growth and made its presence felt at National level. To produce highly efficient and skilled human resource for giving boost to activities of livestock and fishery sectors in Punjab, the university has created College of Fisheries, College of Dairy Science and Technology, School of Animal Biotechnology, and Veterinary Polytechnic. To address issues of Zoonoses, Food safety, environmental pollutants, through research and collaboration with various agencies, the university has established School of Public Health and Zoonoses. Three Regional Livestock Research and Training centres at Kaljharani (Bathinda), Talwara (Hoshiarpur) and Booh (TaranTaran) have been established for catering to the specific needs of the area. Three Krishi Vigyan Kendras have been established each at TaranTaran, Barnala and Mohali districts of Punjab for technology assessment, refinement and demonstration. The University got accreditation from UGC and ICAR and has been admitted as a regular member of Association of Indian Universities (AIU). ICAR has accredited all the three constituent colleges of the university i.e. College of Veterinary Science, College of Fisheries and College of Dairy Science and Technology.

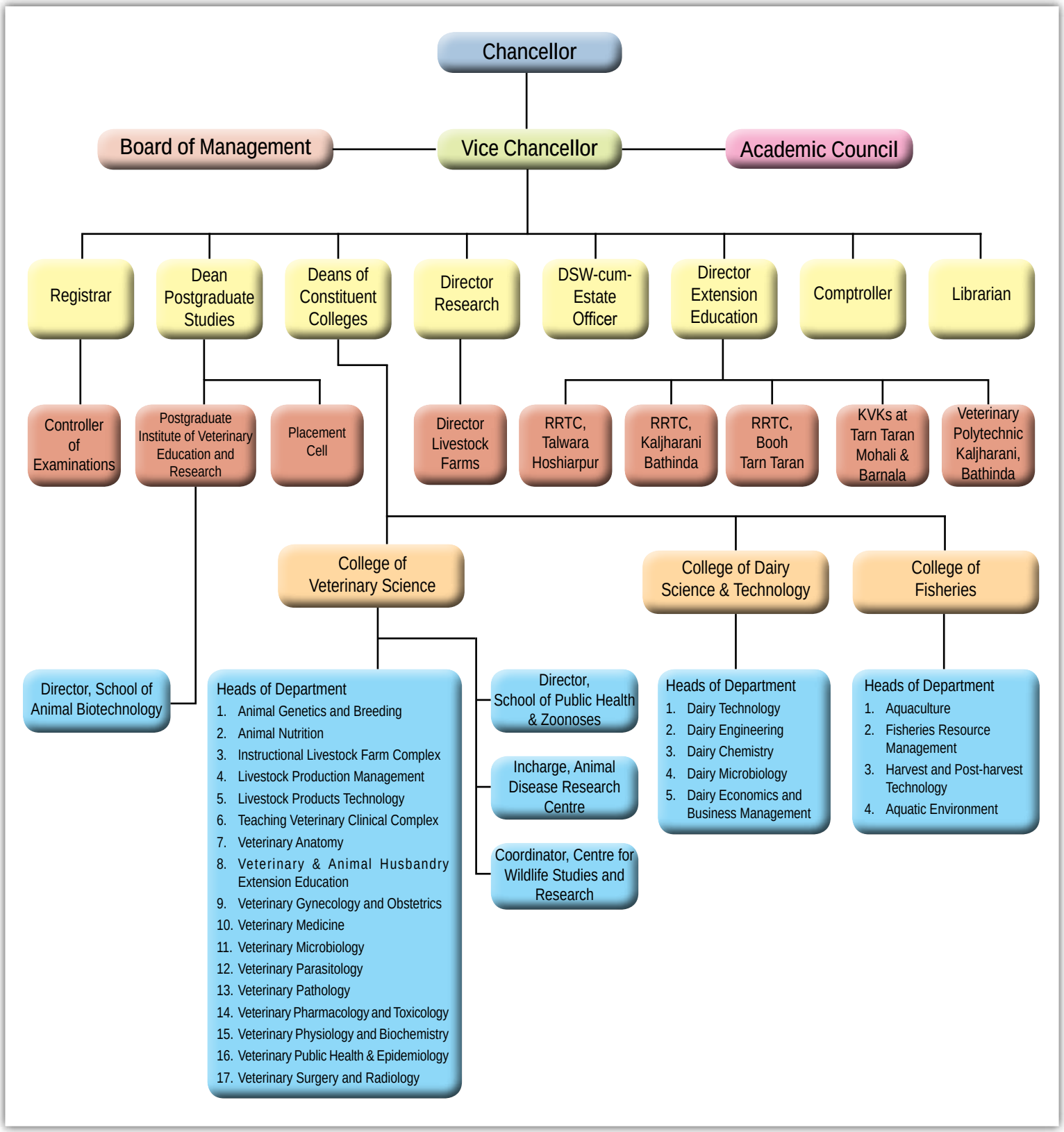
- Accreditation from ICAR in 2012
- Accreditation from UGC in 2010
- A regular member of Association of Indian Universities (AIU)
- Ranked No. 1 Veterinary University (http://www.4icu.org/in)



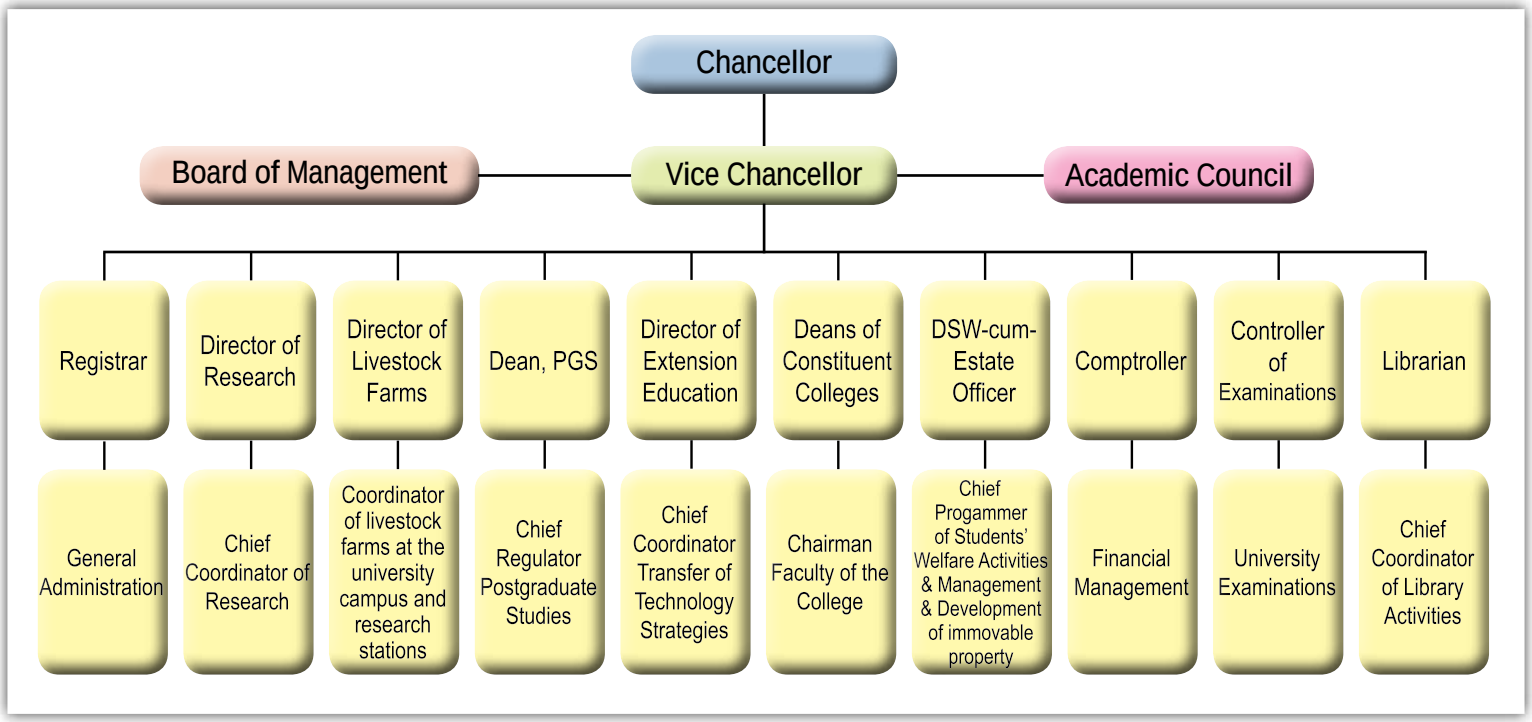
Mandate of the University

- To provide adequate supply of trained veterinary professionals including Master's and Doctorate level specialists capable of handling livestock health and production aspects according to the needs of the State Government and allied agencies.
- To undertake research work in selected areas following multi-disciplinary approach.
- To provide opportunities for continuing professional education in veterinary science.
- To provide consultancy and specialist services to livestock owners, government, semi-government and allied agencies.
- To run "Referral" hospital for specialized treatment of the livestock patients and to provide clinical training to the students.
- To provide technical expert opinion to different government and other agencies.
- To foster faculty development by providing them opportunities to participate in appropriate training programmes, conferences, workshops, seminars, symposia etc. and avail opportunities in exchange programmes.
- To encourage cooperation and collaboration with other departments, colleges, universities and industries both at national and international level.

ORGANIZATIONAL SETUP



FUNCTIONAL CHART



The functioning of the university is governed by following bodies focused at education, research and extension activities:

- Board of Management
- Academic Council
- Committee on Student's Welfare
- Research Advisory Committee
- Extension Education Advisory Committee
- Resident Instruction Committee
- Postgraduate Committee
- Board of Studies

The Board of Management is the highest administrative body which controls the finances and assets of the university, appointments of all officers and teachers and provides overall guidance on running of the university. The Academic Council administers the academic functions of the university and is responsible for maintenance of standards of institution, education and examination. Committee on students' welfare regulates various students' activities. Research Advisory Committee regulates the allocation of funds for research, conditions for accepting grants and other matters regarding research programmes of the university. Extension Education Advisory Committee coordinates university extension programmes with the state and the center and devises ways and means to implement university extension education programmes. Resident Instruction Committee makes recommendations to the Academic Council concerning the new curricula and arrangement, alteration and abolition of existing curricula. Postgraduate Committee examines the courses and curricula for postgraduate students recommended by the Board of Studies before submission to Academic Council. Board of studies proposes to the Academic Council through Resident Instruction Committee, the courses of study and curricula for various teaching programmes. Board also reviews from time to time the standards of teaching and evaluation of students.

ADMINISTRATION

BOARD OF MANAGEMENT

Honorary Chairman

- His Excellency Prof. Kaptan Singh Solanki, Chancellor and Governor of Punjab, Chandigarh.

Working Chairman

- Dr. A.S. Nanda, Vice-Chancellor, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

Members

Ex-officio Members

- Shri Sarvesh Kaushal, IAS, Chief Secretary, Govt. of Punjab, Chandigarh.
- Shri M.S. Sandhu, IAS, Additional Chief Secretary, Department of Animal Husbandry, Fisheries & Dairy Development, Punjab, Chandigarh.
- Shri Suresh Kumar, IAS, Additional Chief Secretary Development, Department of Agriculture, Punjab, Chandigarh.
- Shri D.P. Reddy, IAS, Principal Secretary to Govt. of Punjab, Department of Finance, Chandigarh.
- Dr. Harjinderjeet Singh Sandha, Director of Animal Husbandry, Punjab, Chandigarh.
- Sh. Inderjit Singh, Director, Dairy Development, Punjab, Chandigarh.
- Dr. Madan Mohan, Director and Warden of Fisheries, Punjab, Chandigarh.
- Dr. B.N. Tripathi, Director, National Research Centre for Equines, Hisar.
- Dr. Asha Dhawan, Dean, College of Fisheries, GADVASU, Ludhiana.

Non-official Members

- Dr. Suresh S.Honnappagol, Animal Husbandry Commissioner, DAHDF, Ministry of Agriculture, New Delhi.
- Shri Sukhharpreet Singh Rode, VPO Rode, Tehsil Bagha Purana (Moga).
- Shri Gur Jatinder Singh Virk, Village Kadhola, Tehsil Chamkaur Sahib, Distt. Roopnagar.
- Shri Sanjeev Nagpal, Engineer, Arya Samaj Road, Fazilka.
- Smt. Navpreet Kaur wife of Sh Harsharan Singh, Village Manawalan, District Amritsar.
- Dr. Baljit Singh, Professor and Associate Dean (Research), Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, Canada.
- Dr. Dilbagh Singh Rana, 18038, 64th Ave, Surrey BC, V3S 1Z5, Canada.

Special Invitee

- Dr. B.S. Dhillon, Vice-Chancellor, Punjab Agricultural University, Ludhiana.
- Dr. C.K. Singh, President,GADVASU Teacher's Association, Ludhiana.

Secretary

- Dr. Sushil Prabhakar, Registrar, GADVASU, Ludhiana.

ACADEMIC COUNCIL

Chairman

- Dr. A.S. Nanda, Vice-Chancellor

Members

- Dr. S.N.S. Randhawa, Director of Research
- Dr. Simrat Sagar Singh, Dean Postgraduate Studies
- Dr. H.S. Sandhu, Dean, College of Veterinary Science
- Dr. Asha Dhawan, Dean, College of Fisheries
- Dr. Anil Kumar Puniya, Dean, College of Dairy Science and Technology
- Dr. H.K. Verma, Director of Extension Education
- Dr. Parkash Singh, Head, Department of Veterinary Gynaecology & Obstetrics
- Dr. B.K. Bansal, Head, Department of Veterinary Medicine
- Dr. Amarjit Singh, Incharge, Animal Disease Research Centre
- Dr. Meera D Ansal, Head, Department of Aquaculture
- Dr. P.S. Mavi, Head, Department of Teaching Veterinary Clinical Complex

Special Invitee

- Dr. S.P.S. Sangha, Director Student Welfare-cum-Estate Officer
- Dr. N.S. Sharma, Controller of Examinations
- Dr. Ramneek, Director, School of Animal Biotechnology (Additional charge)
- Dr. C.K Singh, President GADVASU Teacher's Association

Secretary

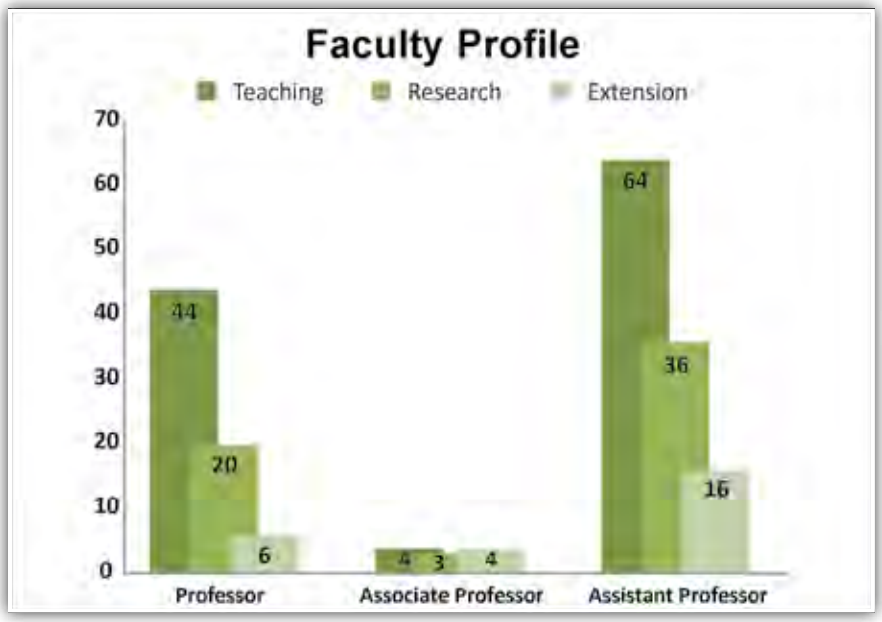
- Dr. Sushil Prabhakar, Registrar, GADVASU, Ludhiana.

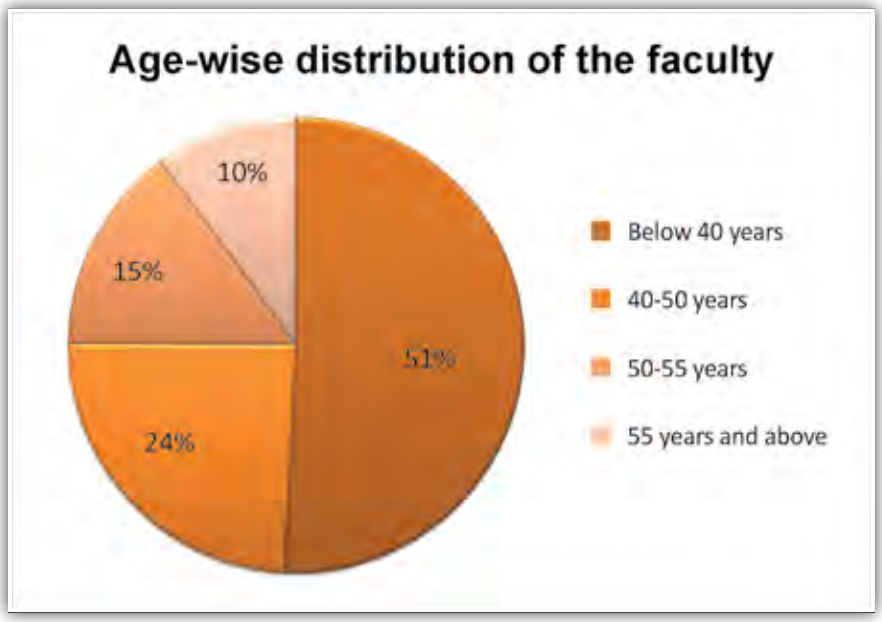
OFFICERS OF THE UNIVERTY

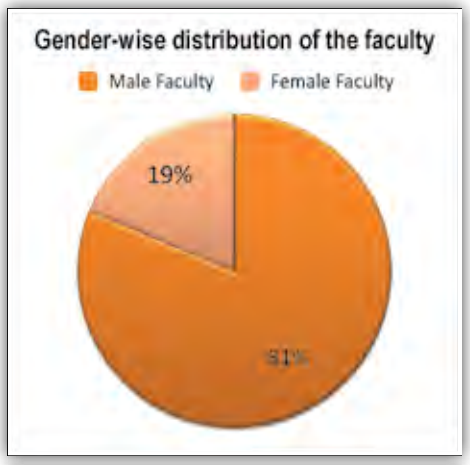
Vice-Chancellor	Dr. Amarjit Singh Nanda
Registrar	Dr. Sushil Prabhakar
Director of Research	Dr. S.N.S. Randhawa
Dean, Postgraduate Studies	Dr. Simrat Sagar Singh
Director of Extension Education	Dr. H.K. Verma
Director Students Welfare-cum-Estate Officer	Dr. S.P.S. Sangha
Dean, College of Veterinary Science	Dr. H.S. Sandhu
Dean, College of Fisheries	Dr. Asha Dhawan
Dean, College of Dairy Science and Technology	Dr. Anil Kumar Puniya
Librarian	Dr. R.S. Brar (Additional Charge)
Controller of Examinations	Dr. N.S. Sharma

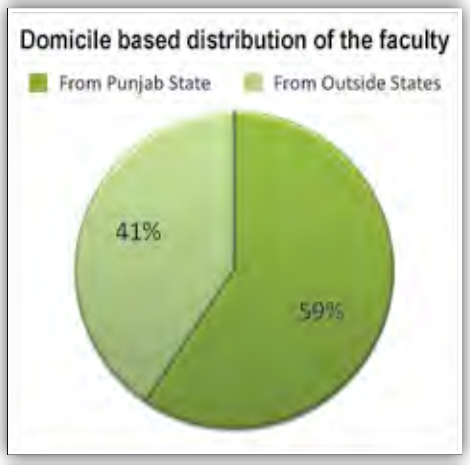
FACULTY PROFILE

Institution	Professor	Associate Professor	Assistant Professor	TOTAL
College of Veterinary Science	62	9	62	133
College of Dairy Science & Technology	1	0	15	16
College of Fisheries	2	0	13	15
School of Animal Biotechnology	2	0	7	9
Veterinary Polytechnic, Krishi Vigyan Kendra's and Others	3	2	19	24
Total	**70**	**11**	**116**	**197**







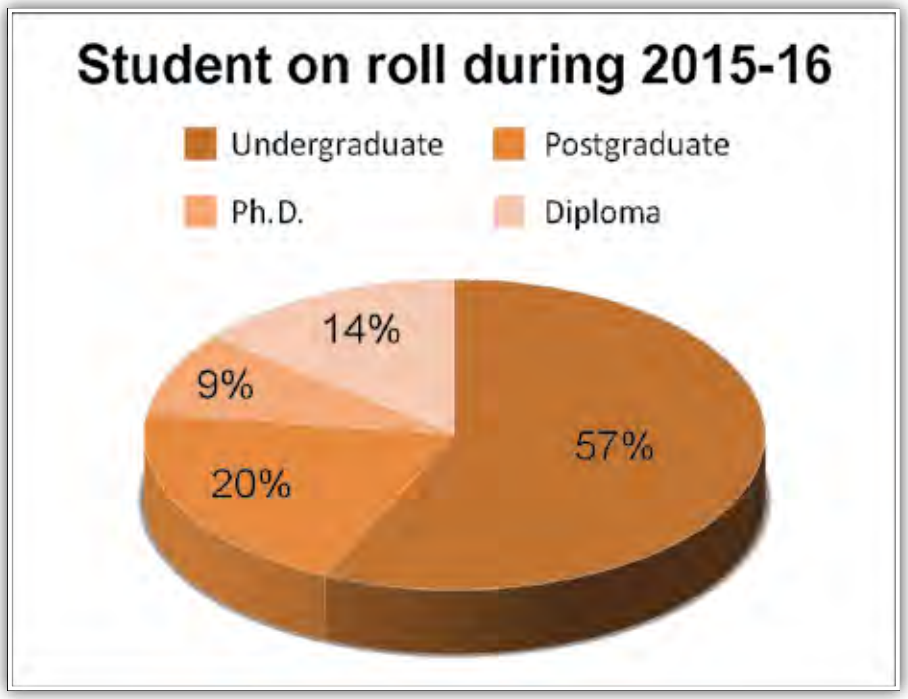


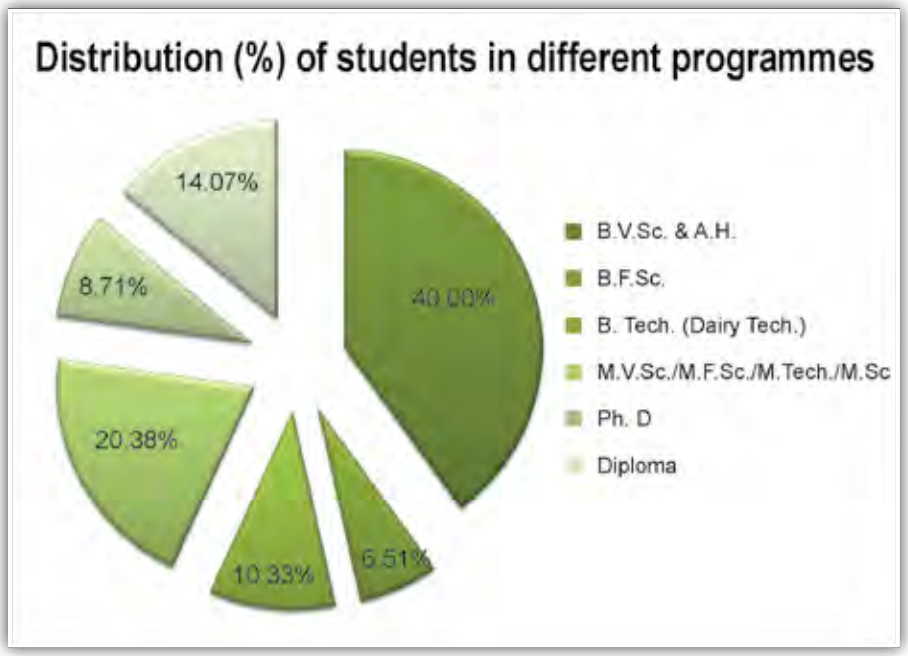


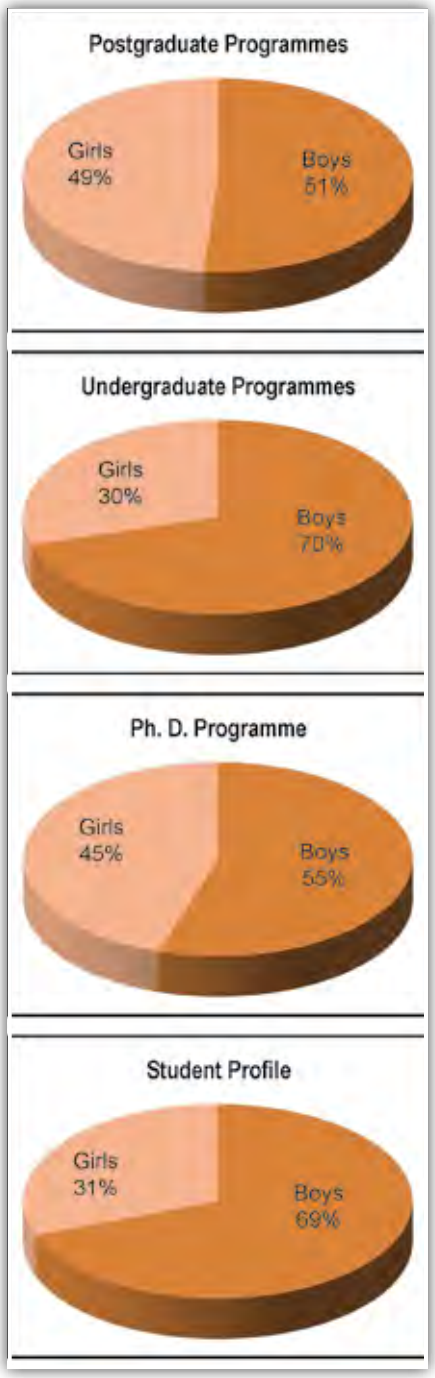


STUDENT PROFILE

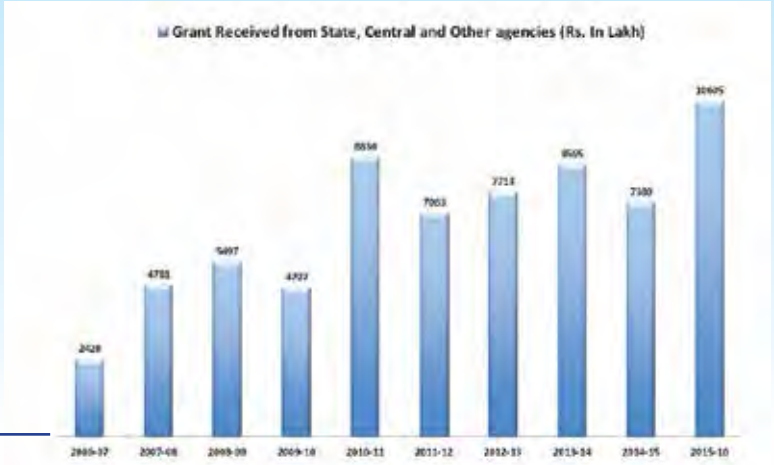
Programme	Boys	Girls	Total
B.V.Sc. & A.H.	278	140	418
B.F.Sc.	45	23	68
B. Tech. (Dairy Tech.)	95	13	108
M.V.Sc./M.F.Sc./M.Tech./M.Sc	109	104	213
Ph.D.	50	41	91
Diploma in Veterinary Science and Animal Health Technology	147	0	147
Total	**724**	**321**	**1045**





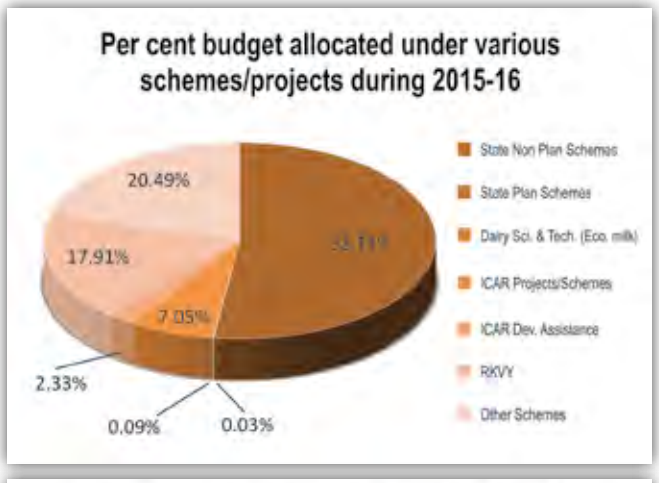


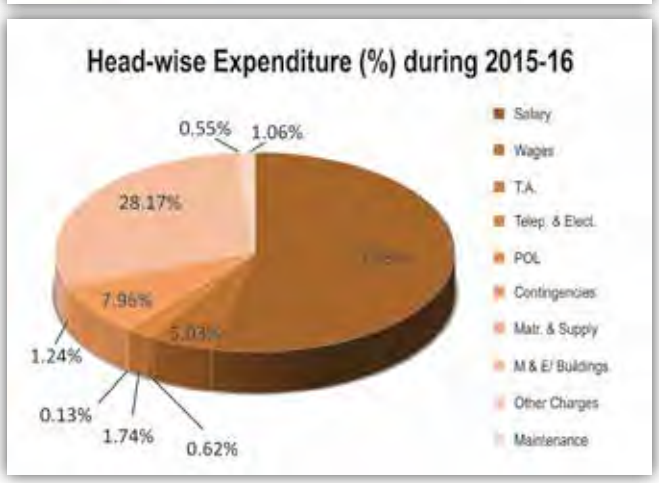
FINANCIAL REPORT

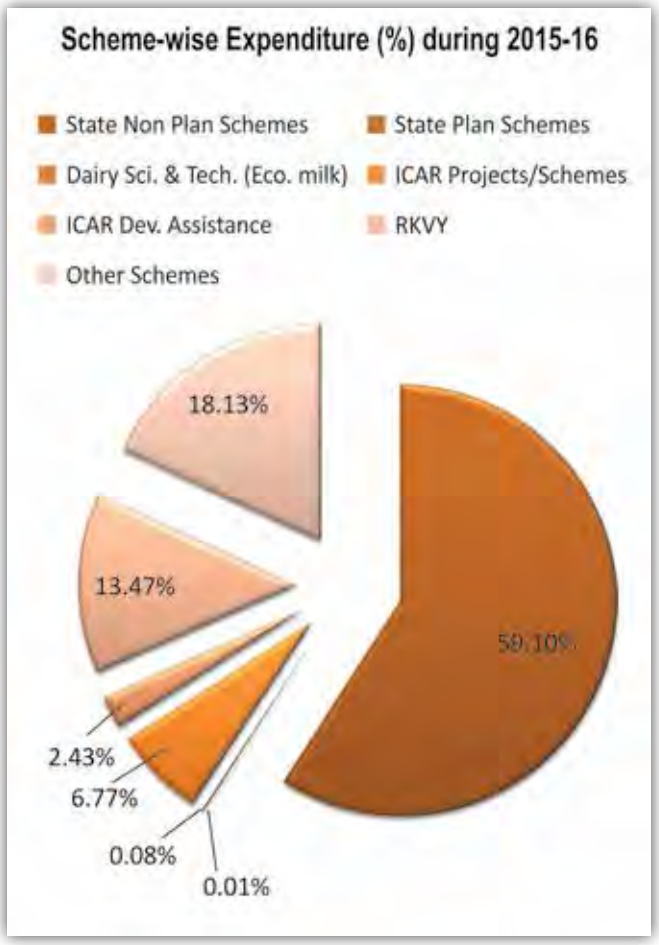


Financial statement indicating budget allocated and amount spent (Rs. in lacs) under various schemes/projects during financial year 2015-16

Schemes	Budget Allocated for 2015-16	Expenditure				
		Salary	Wages	TA	Contingencies & Others	Total
State Non-Plan Schemes	6198.55	5787.08	511.28	12.99	425.26	6736.61
State Plan Schemes	3.07	0.00	0.00	0.00	1.50	1.50
Dairy Sci. & Tech. (Eco. milk)	10.88	8.27	0.95	0.00	0.01	9.23
ICAR Projects/Schemes	838.45	301.95	12.63	9.39	448.01	771.97
ICAR Dev. Assistance	276.85	0.00	0.00	25.99	250.71	276.70
RKVY	2130.54	0.00	0.00	0.03	1535.52	1535.56
Other Schemes	2437.20	15.74	49.34	22.57	1979.34	2066.98
Total	**11895.54**	**6113.04**	**574.19**	**70.98**	**4640.35**	**11398.55**







ACADEMIC UNITS

There are three constituent colleges, viz. College of Veterinary Science, College of Dairy Science & Technology, College of Fisheries, which are imparting undergraduate and postgraduate teaching in various disciplines. Besides, the university has established School of Animal Biotechnology and School of Public Health & Zoonoses to generate scientific expertise and address various health and environment related issues. Three Regional Livestock Research & Training Centres at Kaljharani (Bathinda), Talwara (Hoshiarpur) and Booh (Taran Taran, and three Krishi Vigyan Kendras at Booh (Taran Taran), Barnala and Mohali are established to cater to the area specific requirements of the livestock owners.

College of Veterinary Science

The College of Veterinary Science was set up in 1969 as a constituent college of Punjab Agricultural University, Ludhiana. Now, this college is a part of Guru Angad Dev Veterinary and Animal Sciences University. The college was created to be a centre of regional, national and international excellence in teaching, research and learning in animal health and production. It carries out teaching, research and extension education programmes pertaining to livestock production and health and has been instrumental in ushering in an era of 'White Revolution' in the State.

The college has highly competent and experienced faculty members who have made significant contributions in research on animal health and production and won various national and international awards. The college is recognized by the Veterinary Council of India and has obtained accreditation from the Indian Council of Agricultural Research (ICAR) in the year 2004. The Minimum Standards of Veterinary Education Degree Course (B.V.Sc. & A.H.) Regulations, 1993 of Veterinary Council of India (VCI), subsequently revised in 2008, have been implemented in the college. External examination system for B.V.Sc. & A.H. programme was introduced from the year 1998 onwards. The college has two ICAR Centres of Advance Faculty Training in the Departments of Veterinary Surgery



Programme	Available Seats
B.V.Sc. & A.H. (5 years)	60-for residents of Punjab State and Union Territory of Chandigarh 9-Nominees of the VCI 12-NRI candidates 9-Self financed seats
M.V.Sc. (2 years)	47-for residents of Punjab State and Union Territory of Chandigarh 48-Nominees of the ICAR 10-NRI candidates Self financed seats (two in each discipline)
Ph.D. (3 years)	37-for residents of Punjab State and Union Territory of Chandigarh Nominees of the ICAR (one in each discipline) Self financed seats (two in each discipline)

& Radiology and Veterinary Gynaecology and Obstetrics.

The College of Veterinary Science has 17 departments having excellent laboratory facilities and adequate infrastructure for the undergraduate and postgraduate teaching and research, a well-equipped teaching veterinary hospital to cater to the needs of large and small animal health care. In addition, the college also has an elite dairy herd and poultry farm for teaching and research.

School of Public Health and Zoonoses was established after upgradation of Department of Veterinary Public Health and has the mandate for teaching and research on diagnostic and prevention of zoonotic diseases; food safety and quality control; environmental hygiene and pollutants; and food borne pathogens and their toxins. School of Public Health and Zoonosis thus would be instrumental in developing strategies for control of zoonotic diseases, recommending food safety guidelines through novel research in the area of food safety, food production and processing practices prevalent in the region. The School has well equipped laboratories for Residue Analysis, Zoonoses, Food safety and quality control, Water testing and Brucellosis diagnostics. International collaborative research project with University of Saskatchewan, Canada under International Partnership Fund Programme to study impact of environmental pollutants on human and animal health is also operational in the school. The School of Public Health and Zoonoses has initiated a Collaborative Research and Training Experience on infectious disease, food safety and Public Policy funded by Natural Science and Engineering Research Council, Canada in collaboration with University of Saskatchewan, Canada and Free University, Berlin.

The college offers the following programmes of study:

- B.V.Sc. & A.H. (5-year programme)
- M.V.Sc.
- Ph.D.

The programme leading to the award of the B.V.Sc. & A.H. degree is designed to equip graduates with the knowledge and skills essential to a veterinary career. The programme is divided into three phases. The pre-clinical phase, undertaken in years one and two, provides education in basic sciences such as anatomy, physiology and biochemistry, as well as in animal husbandry through intramural learning. The para-clinical phase, undertaken in years three and four, includes bridging subjects between the pre-clinical and clinical phases, such as pathology, microbiology, parasitology and pharmacology. The clinical phase (surgery, medicine and gynaecology) starts in year four and culminates in the fifth year. At the end of course work (9 semesters), the students undergo a compulsory rotational internship programme of six calendar months on the training in diagnostic laboratories, clinical practice and animal production technology. The programme aims to enrich the knowledge of the students to be professionally competent and face the professional challenges.

The successful completion of B.V.Sc.& A.H. programme entitles the graduates to seek mandatory registration with the Punjab State Veterinary Council / Veterinary Council of India as registered veterinary practitioner.

College of Dairy Science and Technology

College of Dairy Science and Technology was established in the year 2008 at Ludhiana as one of the constituent colleges of the Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (Punjab). The major objective of the college is to produce trained human resource through its undergraduate and post graduate programmes to meet the technical manpower requirements of dairy & food processing industries, government departments and R&D organizations. Development of new technologies in the field of milk processing and dairy products development as well as their transfer to end users is another important objective of the College of Dairy Science & Technology. Presently, the college is offering a 4-year programme in B. Tech. (Dairy Technology) and 2-year programme in M. Tech. (Dairy Technology, Dairy Engineering and Dairy Microbiology) along with M. Sc. (Dairy Economics and Business Management), which are unique job oriented courses for the overall development of students as highly professional dairy specialists through value based education, research and training in dairy science and technology.



Programme	Available Seats
B.Tech. (Dairy Technology) (4 years)	25-for residents of Punjab State and Union Territory of Chandigarh 4-Nominees of the ICAR 3-NRI candidates 2-Nominees from other states not having College of Dairy Science and Technology
M.Tech. (Dairy Technology, Dairy Engineering & Diary Microbiology) M.Sc. (Dairy Economics) (2 years)	5-for residents of Punjab State and Union Territory of Chandigarh 5-Nominees of the ICAR

The four year B.Tech. (Dairy Technology) programme is a unique job oriented course for the overall professional development of dairy specialists to meet the requirements of industry, research and development. The programme follows the course curriculum as recommended by the 4th Dean's committee constituted by the Indian Council of Agricultural Research, New Delhi. The programme has been structured into eight semesters. The first six semesters include the courses (Theory & Practicals) on Dairy Technology, Dairy Engineering, Dairy Chemistry, Dairy Microbiology and Dairy Economics & Business Management. Seventh and eighth semesters include in-plant training practica on different aspects of Dairy Technology. M.Tech. and M.Sc. programmes in the college of Dairy Science and Technology has been started to strengthen the research programmes of the college. Under both undergraduate and postgraduate programmes the students are exposed to every aspect of equipment designing, technology of product making and quality assurance.

College of Fisheries

To provide an effective human resource, technical and outreach backup to the fisheries sector of the State for further expansion and development in terms of productivity and sustainability, College of Fisheries, GADVASU was established in April, 2008, with the following objectives:

- To develop qualified human resource in fisheries.
- To carry out basic, applied and adaptive research for higher fish productivity.
- To disseminate the developed technologies to the farmers and entrepreneurs for commercial adoption.

The college has competent and experienced faculty and is well equipped with both laboratory and farm facilities including instructional farm for experiential learning, trainings & demonstrations, spread over 6 ha area, to carry out teaching, research and extension activities efficiently. The college offers following programmes of study:

- B.F.Sc.
- M.F.Sc. in Aquaculture
- M.F.Sc. in Fisheries Resource Management
- Ph. D. in Aquaculture
- Diploma in Inland Fisheries (DIF)



Programme	Available Seats
B.F.Sc. (4 years)	18-for residents of Punjab State and Union Territory of Chandigarh 3-Nominees of the ICAR
M.F.Sc. (Aquaculture) M.F.Sc. (Fisheries Resource Management) (2 years)	8-for residents of Punjab State and Union Territory of Chandigarh 3-Nominees of the ICAR
Ph.D. (Aquaculture) (3 years)	2-for residents of Punjab State and Union Territory of Chandigarh
Diploma in Inland Fisheries (DIF)	5-for Govt. of Punjab Nominees

Over a short span of 7 years, Since its establishment in 2008, College of Fisheries, GADVASU has registered commendable academic growth and has made significant contributions in the development of the fisheries sector of the State through producing quality skilled fisheries graduates and postgraduates, generating need based technologies for vertical as well as horizontal expansion of aquaculture sector and transfer of technologies to the farmers through an efficient 'Lab to Land' extension programme

The curriculum of the four year UG degree programme (B.F.Sc.) is based on recommendations of the 4th Dean's Committee of the ICAR and is divided into eight semesters. During the first six semesters, courses (theory and practical) cover taxonomy, anatomy, physiology, biology, biochemistry, culture techniques, nutrition, breeding, disease management, aquatic ecology, genetics, biotechnology, culture and capture fisheries resources and their management, post-harvest technology, marketing and trading, economics and statistical methods and extension education. During the 7th semester the students undergo on-campus experiential learning programme (credit Hours- 0+25) and take up In-plant training (credit hours- 0+20) in the 8th, which includes practical training at aqua-farms, hatcheries, feed industry, fish markets and processing/value addition units. The curriculum of M.F.Sc and Ph.D in Aquaculture is also based on ICAR recommendations covering both theory and research in the field of advanced aquaculture technologies. One year PG diploma in Inland Fisheries is offered to the in-service candidates of the State Fisheries Department.

School of Animal Biotechnology

The Department of Animal Biotechnology was established in February, 2008 under the aegis of PGIVER. In view of the progress made by the department, and the opportunities available in biotechnology, the university established the School of Animal Biotechnology in September 2010 by upgrading the department with the mandate to integrate and strengthen the research in various facets of molecular biology with the aim of improving livestock productivity and health, and to produce professionally trained manpower.

The broad mandates of the School of Animal Biotechnology include:

- To generate scientific expertise and human resource in various facets of animal biotechnology
- To develop specialized and state of art facilities for research in cutting edge fields of biotechnology
- To undertake research in different areas of molecular biology and biotechnology for improving animal health and productivity



Programme	Available Seats
M.V.Sc. (2 years)	2-for residents of Punjab State and Union Territory of Chandigarh 1-Nominees of the ICAR 8-Nominees of JNU
M.Sc. (2 years)	4-for residents of Punjab State and Union Territory of Chandigarh
Ph.D. (3 years)	6-for residents of Punjab State and Union Territory of Chandigarh 2-for candidates having scholarship/ fellowships from national funding agencies

Presently the School is offering M.V.Sc./ M.Sc. (Animal Biotechnology) and Ph.D. (Animal Biotechnology). The M.V.Sc./M.Sc. and Ph.D. programs in Animal Biotechnology follow the course curriculum as recommended by the Indian Council of Agricultural Research for the Animal Biotechnology group. School of Animal Biotechnology has been granted accreditation to confer M.V.Sc./ M.Sc. and Ph.D degrees under the aegis of Ministry of Science and Technology.

Veterinary Polytechnic, Kaljharani (Bathinda)

With an aim to produce trained supporting man power capable of handling livestock health and production, GADVASU has established a Veterinary Polytechnic at Kaljharani, District Bathinda for imparting Diploma in Veterinary Science & Animal Health Technology in 2010. The diploma has been designed for the training of veterinary pharmacist to support and complement veterinary practitioners in a better way, in order to provide better care and guided treatment to domesticated animals within veterinary hospitals, veterinary colleges, research institutes etc.



Programme	Available Seats
Diploma in Veterinary Science & Animal Health Technology (2 years)	70-for residents of Punjab State and Union Territory of Chandigarh 2-For residents of Kaljharani, Bathinda

Placement Cell

The university has a placement cell which is manned by experienced members well-versed with job opportunities in Veterinary Science, Fisheries and Dairy sector. The placement cell is involved in organizing different activities for the personality development and to provide information and guidance for the better placement of the young graduates of the university. The university has a very impressive track record of placement of its graduates in highly competitive organizations both within and outside the country.

SETUP OF THE UNIVERSITY

- Administrative block
- College of Veterinary Science
  – Main building
  – Silver Jubilee Block
  – Teaching Veterinary Clinical Complex
  – Veterinary Diagnostic Laboratory
  – Livestock Farms
  – Animal Nutrition
  – R&V Sqn NCC
  – Small Animal Colony
  – Animal Disease Research Centre
  – Centre of Wild Life Studies and Research
- University Library
- Controller of Examinations
- Examination Hall
- Auditorium
- Scientist Home
- Kisan Hostel
- College of Dairy Science
  – Experimental Dairy Plant
- College of Fisheries
  – Experimental & Demonstration Fish ponds
  – Fish Hatcheries
  – Poly houses, Raceway, Net house
  – Feed Mill
- School of Animal Biotechnology
- School of Public Health Zoonoses
- Veterinary Polytechnic
- Regional Research and Training Centre
  - RRTC, Kaljharani, Bathinda.
  - RRTC, Booh, Tarn Taran.
  - RRTC, Bhatoli, Talwara, Hoshiarpur.
- Krishi Vigyan Kendras:
  - Booh, Tarn Taran
  - Majra, Mohali
  - Handiayia, Barnala
- Hostels – boys (2), girls (1), NRI (1)
- Shared facilities – Health Centre, Play Grounds, Faculty Accommodation

Affiliated Colleges:

- Khalsa College of Veterinary and Animal Sciences, Amritsar
- Baba Heera Das Ji College of Veterinary Pharmacy, Village Badal, Muktsar

TEACHING



Academic programs of the university are of high standard and attract students and fellows both at national and international level for education and research.

Educational Programme(s)

Admissions to the various undergraduate programs of the university, and Diploma for Veterinary Pharmacists are strictly on the basis of entrance examinations conducted by the Controller of Examinations.

Entrance Tests conducted by Controller of Examinations for admission to various programmes of the University

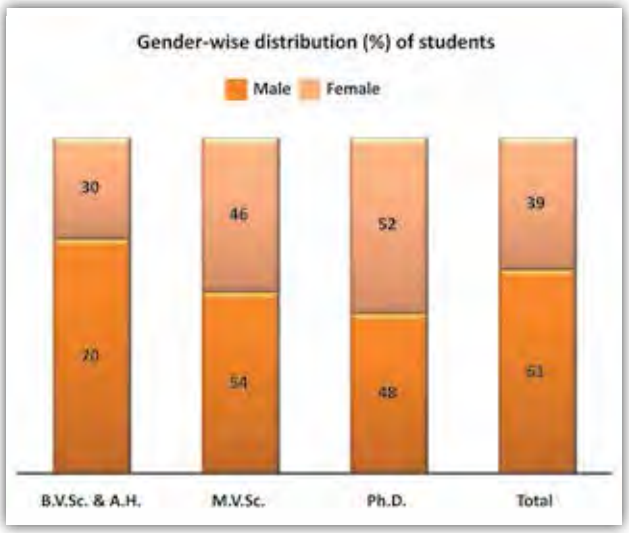
Test	Date of Test	Number of Applications Received	Number of Candidates appeared in the test
Common Entrance Test (CET-2015) for admission to undergraduate programs of the university i.e B.V.Sc. & A.H./ B.F.Sc./ B. Tech (Dairy Technology)	18.06.2015	2701	2516 (Male candidates=1621 Female candidates=895)
Common Entrance Test for admission to Diploma in Veterinary Science & Animal Health Technology programme	16.08.2015	773	710 (Male candidates=696 Female candidates=14)

The detail of admissions made in various undergraduate and postgraduate programmes for the academic session 2015-16 is as below:

Program	General/ Reserve Categories	VCI/ICAR/ JNU/ State Govt. Nominations	NRI Seats/ Foreign Nationals	Total
B.V.Sc. & A.H.	60 + 9 (self-financed)	9	15	93
B.F.Sc.	22	-	1	23
B. Tech. (Dairy Technology)	28	2	-	30
M.V.Sc./M.Sc. (ABT)/ M.F.Sc. / M. Tech. (Dairy Technology)	61	38	1	100
Ph.D.	26	2	1	29
Diploma in Veterinary Science &Animal Health Technology	72	-	-	72
Grand Total				**347**

College of Veterinary Science

The total number of students admitted in the College of Veterinary Science for the session 2015-16 was 199 which included 93 in B.V.Sc. and A.H., 83 in M.V.Sc. and 23 in Ph.D program. Among 199 students admitted, 121 were male and 78 were female. The gender-wise distribution of male and female students admitted in different programmes of College of Veterinary Science is shown as below:



During 2015-16, a total of 160 students successfully completed their degrees, of which 75, 68 and 17 students completed B.V.Sc. & A.H., M.V.Sc. and Ph. D. programmes in different disciplines, respectively.

Scholarships/Fellowships

The university awards merit scholarships to students for academic excellence. During 2015-16, university merit scholarship was given to 50 undergraduate, 66 M.V.Sc. and 22 Ph. D students. Seven undergraduate students admitted through an all India entrance examination were awarded National Talent Scholarship. Junior Research Fellowship of ICAR was awarded to 8 M.V.Sc students and Senior Research Fellowship to 2 Ph.D students. Fourteen students received INSPIRE fellowship.

Courses Taught

The undergraduate students of the college were offered courses as per the course curriculum of Veterinary Council of India. The 1st 2nd 3rd and 4th professional B.V.Sc. & A.H. students were offered courses as per Veterinary Council of India – Minimum Standards of Veterinary Education Degree Course (B.V.Sc & A.H.) Regulations, 2008.The students were offered 97 courses in the Semester I and 80 courses in Semester II according to the new guidelines. Postgraduate students were offered courses in their respective major, minor and supporting field as approved by the Dean, Postgraduate Studies.

Internship Program

After completion of course work in nine semesters, 75 B.V.Sc. and A.H. students of 2010 Batch were registered to the six months compulsory internship programme. The students underwent training program in 6 departments (Veterinary Medicine, Epidemiology and Preventive Medicine, Veterinary Surgery and Radiology, Veterinary Gynaecology and Obstetrics, Livestock Production Management and Teaching Veterinary Clinical Complex) for a period of 6 months.



Passing out Veterinary Graduates of 2010 batch



Oath taking ceremony of 2010 batch

All India Study Tour

Seventy four students of B.V.Sc.&A.H. (2011 batch) attended all India Study Tour from December30, 2015 to January 12, 2016. The students visited various Veterinary Colleges, National Institutes, Laboratories and places of academic interest at Mumbai, Goa, Bengaluru and Hyderabad.



Student of College of Veterinary Science (2011 batch) at Hyderabad Veterinary College



Student of College of Veterinary Science (2011 batch) at Bombay Veterinary College

Thesis/Dissertations

Master of Veterinary Science

S. No	Name	Month & Year of completion	Major Subject and Title of Thesis
1.	Rajan Singh	April, 2015	VETERINARY MICROBIOLOGY "Studies on molecular detection of mycotoxicogenic fungi in poultry/ cattle feed".
2.	Gagandeep Singla	April, 2015	VETERINARY MEDICINE "Studies on prevalence and therapeutic management of hypertension in dogs".
3.	Gursharan Singh	May, 2015	VETERINARY PARASITOLOGY "Studies on copro-prevalaence of coccidian parasites and sero-prevalence of neosporacaninum in dogs".
4.	Harsimrandeep Singh Uppal	May, 2015	VETERINARY PARASITOLOGY "Prevalence of gastrointestinal canine helminthosis with special reference to molecular diagnosis of ancylostomosis".
5.	Ankush Rana	July, 2015	VETERINARY MEDICINE "A study on surveillance, etiology and therapeutic aspects of iodine deficiency in ruminants".
6.	Jiwanjot Kaur Dhaliwal	July, 2015	ANIMAL NUTRITION "Evaluation of some protein feedstuffs for their energy values in dogs".
7.	Ali Haidar Haidari	July, 2015	LIVESTOCK PRODUCTION MANAGEMENT "Ameliorating Environmental stress through dietary manipulation of yucca schidigera in broilers".
8.	Ankaj Thakur	July, 2015	LIVESTOCK PRODUCTION MANAGEMENT "Effect of stocking density on the performance of beetal kids under stall-fed conditions".
9.	Prajwalita Pathak	July, 2015	ANIMAL GENETICS & BREEDING "Evaluation and comparison of reproductive, carcass, growth and immune responsiveness traits in divergent stocks of chicken".

S. No	Name	Month & Year of completion	Major Subject and Title of Thesis
10.	SoniKumari	July, 2015	ANIMAL GENETICS & BREEDING "Studies on genetic and non-genetic factors affecting prediction of first lactation milk yield from part records in crossbred cattle".
11.	Digvijayaditya Singh Mandhotra	July, 2015	ANIMAL NUTRITION "Effect of selected probiotic consortium supplemented in the feed of dogs on their growth and digestibility of nutrients".
12.	Manjula Thakur	July, 2015	ANIMAL NUTRITION "Evaluation of soya pulp feeding on the performance of dairy cattle".
13.	Bilal Ahmad Ganaie	July, 2015	VETERINARY GYNAECOLOGY & OBSTETRICS "Ovarian and fertility responses following modified synchronization protocol in buffaloes".
14.	Preeti Lakhani	July, 2015	VETERINARY PHYSIOLOGY "Effect of amla powder (Emblica officinalis) supplementation on physiological, metabolic and reproductive status of summer stressed buffaloes"
15.	Correia Salisha Whitney	July, 2015	VETERINARY SURGERY & RADIOLOGY "Studies on the factors contributing to upward fixation of patella in bovine".
16.	Gurwinder Singh	July, 2015	VETERINARY SURGERY & RADIOLOGY "Clinical studies on the ultrasonographic diagnosis and surgical management of intestinal obstruction and caecal dilatation in bovine".
17.	Shriram G.	July, 2015	VETERINARY SURGERY & RADIOLOGY "Ultrasonographic evaluation of lymph nodes and adrenal glands in normal and diseased dogs".
18.	Taranjot Kaur Sran	July, 2015	VETERINARY SURGERY & RADIOLOGY "Evaluation of locking T-plate for the repair of distal third radius ulna fractures in dogs".
19.	Patel Maulikkumar Prahladbhai	July, 2015	VETERINARY GYNAECOLOGY & OBSTETRICS "Effect of heparin binding seminal plasma proteins on sperm attributes during cryopreservation of cattle bull semen".
20.	Jasmer	August, 2015	VETERINARY GYNAECOLOGY & OBSTETRICS "Effect of cooling rate alterations in critical temperature range and supplementation of anti apoptotic proteins on cryosurvival of buffalo bull sperm".
21.	Manoj Kumar Sharma	August, 2015	VETERINARY & ANIMAL HUSBANDRY EXTENSION EDUCTION "Designing a CD-ROM for awareness about abortion in dairy animals".
22.	Adarsh Prashar	August, 2015	VETERINARY MEDICINE "Clinico-biochemcial and therapeutic studies in bovine neonates compromised during parturition".
23.	Mohit Bansal	August, 2015	VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY "Study on prevalence of hepatitis E virus infection in swine and human population in Punjab, India".
24.	Meemansha Sharma	August, 2015	VETERINARY PHARMACOLOGY & TOXICOLOGY "Pharmacokinetics of lincomycin in healthy and diseased model of goats (*Capra hircus*)".
25.	Kamaljyoti	August, 2015	VETERINARY MEDICINE "Diagnosis and medical management of common ear affections in dogs".

S. No	Name	Month & Year of completion	Major Subject and Title of Thesis
26.	Manasa R. Kottadamane	August, 2015	VETERINARY MEDICINE "Clinico-haemato-biochemical and therapeutic studies on Ehrlichiosis in dogs".
27.	Hunny Goyal	August, 2015	VETERINARY SURGERY & RADIOLOGY "Comparative evaluation of midazolam and dexmedetomidine in combination with ketamine and propofol for general anaesthesia in bovine".
28.	Shabnam Sidhu	August, 2015	VETERINARY MEDICINE "Diagnosis and therapeutic management of common cardiomyopathies in dogs".
29.	Guninder Singh Dhesi	August, 2015	LIVESTOCK PRODUCTION MANAGEMENT "Evaluation of biodegraded brewers dried grains in broiler production".
30.	Mohammad Hamed	August, 2015	LIVESTOCK PRODUCTION MANAGEMENT "Effect of feed particle size on the performance and gastrointestinal tract development in broilers".
31.	Anupreet Kaur	August, 2015	VETERINARY SURGERY & RADIOLOGY "Clinical studies on closed stabilization of long bone fractures using end threaded intramedullary pinning in dogs."
32.	Arshdeep Kaur	August, 2015	VETERINARY SURGERY & RADIOLOGY "Studies on the surgical treatment of obstructive colic in equine".
33.	Ritu Thapar	August, 2015	VETERINARY SURGERY & RADIOLOGY "Comparative evaluation of various suturing techniques for cystorrhaphy in dogs".
34.	Shagun Gupta	August, 2015	VETERINARY MICROBIOLOGY "Diagnosis of canine distemper by employing molecular techniques".
35.	Anamika Gupta	September, 2015	VETERINARY PATHOLOGY "Studies on correlation between cytopatholoy and Th1/TH2 cytokine expression in bovine lymphadenopathies".
36.	Swati Sharma	September, 2015	VETERINARY PATHOLOGY "Clinico-pathological studies on gastrointestinal disorders associated with advanced pregnancy in bovines".
37.	Viplav Singh	September, 2015	LIVESTOCK PRODUCTS TECHNOLOGY "Development of soy protein concentrate based bioactive films incorporated with grape seed extract for the extension of shelf life of egg cutlets".
38.	Sachin Dogra	September, 2015	VETERINARY PATHOLOGY "Evaluation of bone marrow and blood for the diagnosis of canine diseases".
39.	C. Lalawmpuia	September, 2015	VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY "Monitoring of antibiotic residues in poultry feed, water and eggs and its public health significance".
40.	Amninder Singh	September, 2015	ANIMAL GENETICS & BREEDING "Genetic analysis for milk production and milk constituent traits of crossbreed cattle".
41.	Gurjot Kaur Mavi	September, 2015	ANIMAL GENETICS & BREEDING "Studies on genetic variability of prolactin and pituitary specific transcription factor-1 genes and their association with economic traits in murrah buffaloes".

S. No	Name	Month & Year of completion	Major Subject and Title of Thesis
42.	Sumeet Singh Chib	September, 2015	LIVESTOCK PRODUCTION MANAGEMENT "Studies on passive cooling strategies for summer stress management in broiler production ".
43.	Rohit Lahoria	September, 2015	VETERINARY & ANIMAL HUSBANDRY EXTENSION EDUCATION "Impact of training on adoption of scientific pig farming practices".
44.	Mranalini Prerna	September, 2015	VETERINARY PARASITOLOGY "Comparative study on synthetic pyrethroid resistance development in Rhipicephalus microplus and Hyalomma anatolicum from western zone Punjab".
45.	Prateek Jindal	September, 2015	VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY "Epidemiological studies on porcine brucellosis in Punjab, India".
46.	Bilawal Singh	September, 2015	VETERINARY GYNAECOLOGY & OBSTETRICS "Impact of melatonin treatment on the reproductive efficiency of buffaloes".
47.	Gurdip Singh	October, 2015	VETERINARY GYNAECOLOGY & OBSTETRICS "Improving pregnancy rate following fixed time artificial insemination and supplementation of hCG in buffaloes".
48.	Mandeep Singh	September, 2015	VETERINARY GYNAECOLOGY & OBSTETRICS "Nuclear magnetic resonance investigations and therapeutics of cystic ovaries in repeat breeding dairy cows".
49.	Sikander Singh	October, 2015	VETERINARY MEDICINE "Hepatic function and serum electrophoretic changes in forestomach impaction constipation syndrome in bovines".
50.	Sahil	October, 2015	ANIMAL NUTRITION "Effect of energy source in crop residue based total mixed rations on the growth of male buffaloes".
51.	Meenu Bala	October, 2015	VETERINARY ANATOMY " Age related histomorphochemical studies on ovaries of Punjab white quail".
52.	Manjot Singh	October, 2015	VETERINARY MEDICINE "Seroepidemiology of contagious agalactia and bluetongue in sheep and goats".
53.	Shabnam Mustafa	October, 2015	VETERINARY MICROBIOLOGY "Molecular diagnosis of haemorrhagic septicaemia and characterization of adhesin proteins of Pasteurella multocida "
54.	Amninder Kaur	October, 2015	VETERINARY PATHOLOGY "Prevalence and pathology of important reproductive tract diseases of swine".
55.	Payal Bhat	October, 2015	VETERINARY PATHOLOGY "Prevalence and pathology of respiratory diseases of swine in Punjab".
56.	Pranita Konwar	November, 2015	VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY "Prevalence and molecular epidemiological studies on trichinellosis in India".
57.	Arunbeer Singh	November, 2015	VETERINARY & ANIMAL HUSBANDRY EXTENSION EDUCATION "Study on job satisfaction level of Veterinary Officers of Punjab state".
58.	Razia Sultana	August, 2015	VETERINARY MEDICINE "Serological and molecular studies on infectious abortions in ovine and caprine in Punjab".

S. No	Name	Month & Year of completion	Major Subject and Title of Thesis
59.	Ajay Mandhotra	November, 2015	VETERINARY PARASITOLOGY "Molecular prevalence and drug efficacy studies for equine piroplasmosis in Punjab"
60.	Ramandeep Singh	November, 2015	VETERINARY PARASITOLOGY "Epidemiology of gastrointestinal parasites of sheep and goats in central plain zone of Punjab"
61.	Rashmi Thakur	November, 2015	VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY "Rapid detection of Staphylococcus aureus in milk by optimizing loop mediated isothermal amplification assay and its comparative evaluation with polymerase chain reaction (PCR)".
62.	Sukhmeen Kaur Sidhu	December, 2015	VETERINARY MEDICINE "Milk somatic cell counts in holstein friesian x sahiwal cross bred dairy cows-physiological variations and relation to quarter infection and milk composition".
63.	Amandeep Singh	December, 2015	VETERINARY MEDICINE "A study on relationship between lameness and udder health in dairy cows".
64.	Gurmukh Singh	December, 2015	LIVESTOCK PRODUCTION MANAGEMENT "Effect of milk feeding management on performance of beetal kids under stall-fed conditions."
65.	Darleen Kaur Grewal	December, 2015	VETERINARY MEDICINE "Studies on selenium status in dairy animals of Punjab."
66.	Divya Trivedi	December, 2015	VETERINARY MEDICINE "Occurrence of milking machine induced teat tissue changes and its relation to quarter health in dairy cows."
67.	Neha Sharma	December, 2015	VETERINARY MEDICINE "Diagnostic and therapeutic studies on rickets in dogs."
68.	Prateek Sharma	December, 2015	VETERINARY MEDICINE "Studies on clinico-biochemical status and welfare indicators of the felilds in captivity."

Ph.D. Programme

Sr. No	Name	Month & Year of completion	Major subject and title of thesis
1.	Vandana Sangwan	April, 2015	VETERINARY SURGERY & RADIOLOGY "B-mode and doppler sonographic study of major blood vessels in cattle and buffaloes."
2.	Ranjit Singh	April, 2015	ANIMAL NUTRITION "Effect of energy enhancement level through lipogenic and glucogenic precursors on metabolic and productive performance of crossbred cows during transition phase".
3.	Daundkar Prashant Sudamrao	April, 2015	VETERINARY PHARMACOLOGY & TOXICOLOGY "Pharmacokinetic and pharmacodynamic studies of ceftiofur in buffalo calves".
4.	Gurpreet Kaur	April, 2015	VETERINARY MICROBIOLOGY "Detection of canine parvovirus from clinical samples using different nucleic acid detection methods and characterization of VP2 gene sequence of field isolates".

Sr. No	Name	Month & Year of completion	Major subject and title of thesis
5.	Paviter Kaur	May, 2015	VETERINARY MICROBIOLOGY "Studies on molecular and serological assays for diagnosis of bovine brucellosis".
6.	Taksande Prachi Eknath	May, 2015	VETERINARY SURGERY & RADIOLOGY "Clinical studies on bovine and canine urolithiasis with special reference to dissolution protocol in dogs".
7.	Aman Dev Moudgil	June, 2015	VETERINARY PARASITOLOGY "Studies on the prevalence and management of parasitic infections in zoo animals".
8.	Deepak Sumbria	June, 2015	VETERINARY PARASITOLOGY "Studies on diagnosis and haematobiochemical alteration in theileriosis of equines in Punjab".
9.	Murad Ali Hiblu	June, 2015	VETERINARY MEDICINE "Clinico-pathological and therapeutic studies on hepatic insufficiency in dogs."
10.	Syed Ashaq Hussain Shah	September, 2015	VETERINARY MEDICINE "Studies on omasal and abomasal disorders in cattle and buffaloes."
11.	Chetna Mahajan	September, 2015	VETERINARY BIOCHEMISTRY "Methane mitigation potential of alternate hydrogen sinks In-vitro and their impact on the performance of male buffalo calves."
12.	Narinder Singh	September, 2015	VETERINARY GYNAECOLOGY & OBSTETRICS "Studies on recovery of in-vivo developed embryos and oocytes from hormonally stimulated buffaloes and in vitro maturation rates of abattoir ovarian oocytes."
13.	Nuzhat Hassan	December, 2015	VETERINARY MEDICINE "Diagnostic and therapeutic studies on chronic diarrhea in diary animals."
14.	Akhilesh Kumar Verma	February, 2016	LIVESTOCK PRODUCTS TECHNOLOGY "Extraction of bioactive peptides from porcine blood and liver and their effects on quality of functional pork loaves."
15.	Devendra Kumar	February, 2016	LIVESTOCK PRODUCTS TECHNOLOGY "Production of bioactive peptides from camel milk and their effect on the quality of functional goat meat patties."
16.	Abdur Rezzaque Choudhury	February, 2016	VETERINARY ANATOMY "Histomorphological and histochemical studies on liver of sheep during prenatal development."
17.	Rayees Ahmad Rather	February, 2016	VETERINARY SURGERY & RADIOLOGY "Clinical studies on the diagnosis and surgical management of corneal ulceration and cataract in dogs."
18.	BhaskarVemu	February, 2016	VETERINARY PHARMACOLOGY & TOXICOLOGY "Evaluation of flubendiamide toxicity through one generation extended reproductive study in rats."
19.	PankajGoswami	March, 2016	VETERINARY PATHOLOGY "Pathoepidemiology of important common respiratory pathogens of bovine in Punjab."
20.	Rajesh Kasrija	March, 2016	VETERINARY & ANIMAL HUSBANDRY EXTENSION EDUCATION "Effectiveness of instructional material designed on the basis of felt needs of the dairy farmers of Punjab regarding common reproductive conditions."

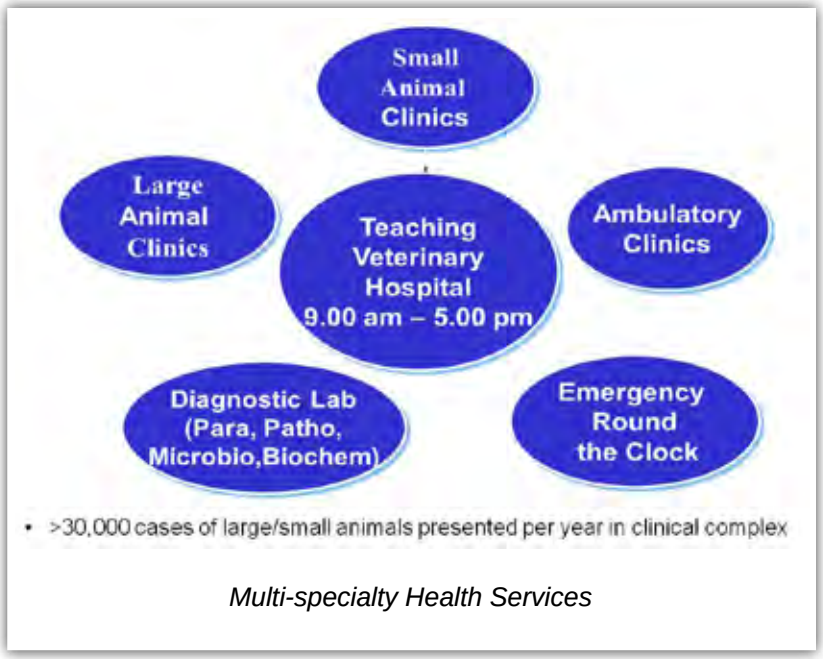
Teaching Veterinary Clinical Complex (TVCC)

The location of different units of Veterinary Clinics and various clinical departments at one place has provided a well integrated and coordinated approach to the diagnosis and treatment of diseases in small and large animals. The department also provides physical facilities for training of undergraduate and postgraduate students; organizes internship programme, provides regular ambulatory service to rural areas; organizes training courses for the field Veterinarians and animal owners; organizes exhibitions at Kisan Melas, Kisan Diwas etc., and provides mass communication through radio, television and printed literature.

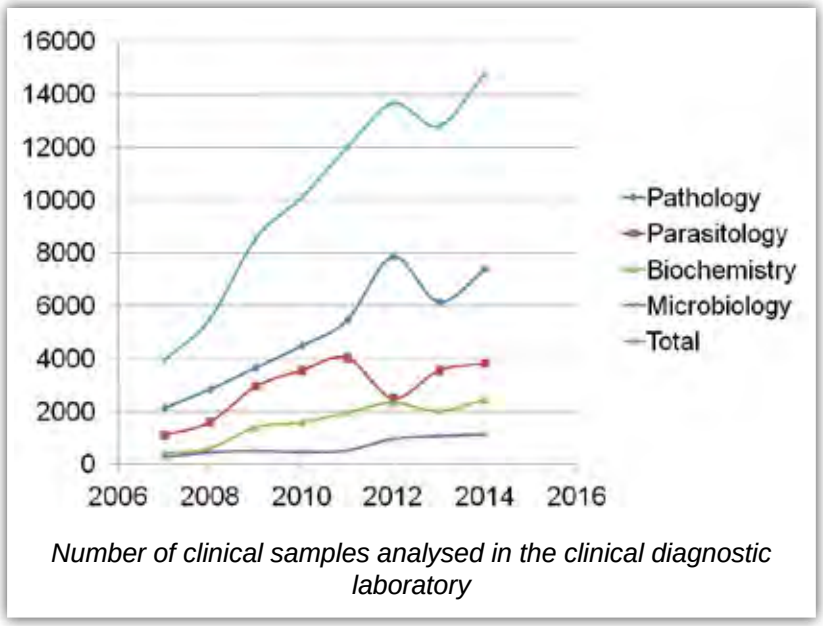
In addition to specialized services for disease diagnosis and treatment of animals, TVCC provides 24 hrs emergency services to the farmers and pet owners.

Specialized services provided by TVCC for disease diagnosis and treatment of animals

a. Ultrasonography in large and small animals
b. Computerized Radiography in large and small animals
c. Laparoscopy in small animals



Multi-specialty Health Services



Number of clinical samples analysed in the clinical diagnostic laboratory

Clinical cases registered in the hospital (Jan 1 to Dec 31, 2015)

	Small animals (dog and cat)	Large animals	Total
Medicine	15389	4168	19557
Surgery	5055	2362	7417
Gyane	536	845	1381
Total	20980	7375	28355

Total number of lab samples tested (Jan 1 to Dec 31, 2015)

Type of Sample	Sample Number
Pathology	
Blood	7381
Urine	421
Cytology	662
Parasitology	
Blood	3044
Faecal	871
Skin	213
Biochemistry	2816
Total	**15408**

R&V Sqn NCC Unit

1st Punjab R&V Sqn NCC is an integral part of College of Veterinary Sciences, GADVASU, is entrusted with the task of imparting infantry, as well as, equestrian training to NCC cadets enrolled with this unit. Various NCC training activities performed by the NCC cadets during the year 2015-2016, are as under:

- 88 Cadets of this unit attended Annual Training Camp from Nov. 14- 23, 2015 at NCC Academy, Malout. During the camp the cadets were imparted rigorous training in drill, physical training, lectures on basic army training, equitation and firing etc.
- 15 SD cadets of this unit attended Army Attachment Camp held at Remount Veterinary College and Centre, Meerut.
- NCC week was celebrated from Nov. 23-30, 2015 in which cadets performed various activities like painting competition, declamation, awareness rallies against social evils and run for fun for good health.
- Three cadets of the unit participated in various equestrian activities during Republic Day Camp and Prime Minister Rally from Jan. 1-31, 2016 and won two Gold Medals.
- The cadets registered their names in Limca book of records for performing yoga as NCC cadets at multiple venues as a largest uniform wearing force to do yoga simultaneously.
- 61 cadets appeared for NCC "B" certificate examination held at CG Complex, Ludhiana.
- The cadets also celebrated Swach Bharat Abhiyaan and Yoga Day.



Annual Training Camp



Show Jumping by NCC Cadet



Swach Bharat Abhiyaan



International Yoga Day

College of Dairy Science and Technology

During the session 2015-16, the total admissions made in various programs were 39, which included 30 in B.Tech. (Dairy Technology) and 9 in M.Tech. (Dairy Technology). Out of these, 33 were male and 6 were female students.

Thesis/Dissertations

M. Tech.

Sr. No.	Name	Month & Year of completion	Title of Thesis
1.	Randeep Singh	May, 2015	"Development of technology for the manufacture of reduced fat yoghurt ice cream from buffalo milk using exopolysaccharide (EPS) producing culture."
2.	Rajvir Kaur	May, 2015	"Development of technology for the manufacture of low calorie milk cake."
3.	Karanpal Singh	September, 2015	"Development of technology for a composite dairy food-dall pinni."
4.	Akashdeep Singh Beniwal	September, 2015	"Development of technology for the manufacture of stable phytosterol dispersions and powder with enhanced functionality."
5.	Anurag	September, 2015	"Optimization studies for manufacture of composite dairy food-bottle gourd burfi."
6.	DadiBhaskar	November, 2015	"Development and characterization of β-glucan enriched low fat functional dahi."

Scholarships/Fellowships

University Merit Scholarship was awarded to 18 students. One student received S. Gurdev Singh Khush Scholarship.

Courses Taught

The undergraduate students were offered courses as per the recommendations of 4th Dean's committee constituted by ICAR, New Delhi. The B. Tech. students were offered 22 courses in 1st Semester and 22 courses in 2nd semester. The postgraduate students were offered 36 courses during 2015-16.

Internship Programme

- 26 students of final year B.Tech. (Dairy Technology) programme are undergoing their In-plant training at the various milk plant of Milkfed, Punjab.
- 28 students of College of Dairy Science & Technology got placement in Milkfed, Punjab through on campus placement. Out of 28, eight are selected for the Deputy Manager posts while remaining 20 students were selected for Dairy Assistant positions.

Experimental Dairy Plant

Experimental dairy plant is an excellent feature of the infrastructure created in the college. The main objectives of the experimental dairy plant is to provide best infrastructure for the practical expertise and hands-on training of B. Tech (Dairy Technology) students and to undertake R&D work by the scientists for scaling up of the laboratory concepts of newly developed technologies to the pilot/ semi-commercial scale. Experimental dairy plant is able to handle app. 2000 L milk/ day, one form of which is pasteurized



Milk Packaging Machine

milk that is offered/ distributed to university residents within campus on sale basis, whereas the surplus milk is processed for value added products.

All India Study Tour

Study tour was conducted from January 4-10, 2016 for 25 of B. Tech (Dairy Technology) final year students to Delhi- Anand-Gandhinagar-Ahmedabad- Jaipur to visit dairy colleges and dairy plants. They visited Mother Dairy (Delhi), Amul (Anand), SMC college (Anand), Vidya Dairy (Anand), Mother Dairy (Gandhinagar), Saras Dairy (Jaipur).



Students of B.Tech Dairy Technology visited Jaipur Dairy

College of Fisheries

Total number of students admitted during 2015-16 in various programs of College of Fisheries were 33, which included 23 in B.F.Sc., 7 in M.F.Sc. and 3 in Ph.D. Out of these, 18 were male and 15 were female students. The percentage of girl students in B.F.Sc. was 56.5 per cent.

Scholarships/Fellowships

University merit scholarship/fellowship to 13 UG and 6 PG students. One student received the G.S. Khush merit scholarship.

Courses Taught

The undergraduate students were offered 23 courses in 1st Semester and 25 courses in 2nd semester. The students were offered 24 PG courses during 2015-16.

Thesis/Dissertations

M.F.Sc in Aquaculture

Sr. No.	Name	Month & Year of completion	Title of Thesis
1	Abhinika Jain	2015	"Carrot and rose petal meal as a natural carotenoid source for pigmentation and growth of freshwater ornamental fish koi carp, Cyprinus carpio (Linnaeus)

All India Study Tour

All India Compulsory Educational Tour of 15 days was conducted for nine B.F.Sc. final year students, from 4th to 20th Jan., 2015 under the supervision of Dr Ajeet Singh (Tour In-charge) and Dr V. I. Kaur (Tour Supervisor). The students visited different national institutes like Indian Agricultural Research Institute (IARI), New Delhi; Central Inland Fisheries Research Institute (CIFRI), Barrackpore, West Bengal; Central Institute of Fisheries Education (CIFE) Regional Centre, Kolkata, West Bengal; Central Institute of Freshwater Aquaculture (CIFA), Kausalyaganga, Bhubaneshwar, Odisha; Central Institute of Fisheries Technology (CIFT), Kochi, Kerala; Central Marine Fisheries Research Institute (CMFRI), Kochi, Kerala; Marine Products Export Development Authority (MPEDA), Kochi, Kerala. Exposure lectures on current issues in Fish and Fisheries and visits were arranged to make students aware of various ongoing teaching, research, extension and developmental activities in these institutes. Students also visited fish landing sites, fishing vessels and fish processing unit along with fish museums and aquarium houses.



All India Educational Tour by final year students of B.F.Sc.

Annual Prize Distribution function, College of Fisheries - 2015-16

Annual Prize distribution function of College of Fisheries held on 30th Nov. 2015. Prizes were distributed to the students for outstanding achievements in academics, sports, NSS & cultural activities. Ms. Paransheel, B.F.Sc. students bagged away the 'Best Student Award' for her outstanding achievements in academics, sports & extracurricular activities. Following students awarded with 'Mata Ind Kaur Award' for achieving highest OCPA in 1st, 2nd and 3rd year B.F.Sc. class

- 1st year B.F.Sc Class – Mr. Amandeep Singh
- 2nd year B.F.Sc Class – Ms. Namrata
- 3rd year B.F.Sc Class – Ms. Gulgul Singh

3rd year B.F.Sc student, Mr. Harpinder Singh was facilitated for his out standing performance in sports. He won Gold Medals in power lifting events at state and district level. Another 3rd year student, Mr. Swarajpal Singh Randhawa was honoured for winning the best actor title in the 6th Inter College Youth festival of GADVASU.



Annual Prize Distribution Function - Award winning students with Dr. Asha Dhawan, Dean College of Fisheries & other faculty members

School of Animal Biotechnology

Total number of students admitted for the session 2015-16 was four which included one in M.V.Sc./M.Sc. and three in Ph.D. program. Among these, three students were girls (75%). During this year, six students in Masters and five students in Ph.D. successfully completed their degree programme.

Courses Taught

A total of 22 courses were offered during the year which included one for UG, 10 for Masters and 11 for PhD.

Thesis/Dissertations

M.V.Sc./M.Sc. Animal Biotechnology

S. No.	Name	Month & Year of completion	Title of thesis
1.	Navneet Kaur	September, 2015	"Expression of tissue inhibitor of metalloproteinase-4 (TIMP-4) from canine mammary tumor".
2.	Gagandeep Kaur	October, 2015	"Characterization of outer membrane vesicles from Brucella abortus and their immunogenicity in mice".
3.	Harmanjot Kaur	October, 2015	"Investigation of different cell types of buffalo mammary gland and identification of putative mammary stem/progenitor cells".
4.	Jaspal Kaur	October, 2015	"Cloning, sequencing and biocomputational analysis of drosha coding sequence in Indian water buffalo (Bubalus bubalis)".
5.	Jaspreet Kaur Gill	October, 2015	"Expression profiling of HSF1 gene and its association with oxidative stress in zebu and crossbred cattle".
6.	Rupinder Kaur	October, 2015	"Characterization of recombinant capsid protein of porcine circovirus-2 (PCV-2) as potential diagnostic antigen".

Ph.D. Animal Biotechnology

S. No.	Name	Month & Year of completion	Major Subject and Title of Thesis
1	Pallvi	June, 2015	"Expression of TLR4 and IL-I β in lungs of mice after single and multiple exposures to poultry barn air".
2	Manpreet Kaur	August, 2015	"Studies on polymorphism of CXCRI gene and its association with subclinical mastitis in Indian water buffalo".
3	Ingle Sonal Arun	September, 2015	"Studies on immunogenicity and protective efficacy of different recombinant proteins of Pseudomonas aeruginosa".
4	Swati	October, 2015	"Studies on the apoptotic effect of canine distemper virus (CDV) genes in tumor cell-lines".
5	Jasdeep Singh	November, 2015	"Differential miRNA profiling in diseased and healthy buffaloes".

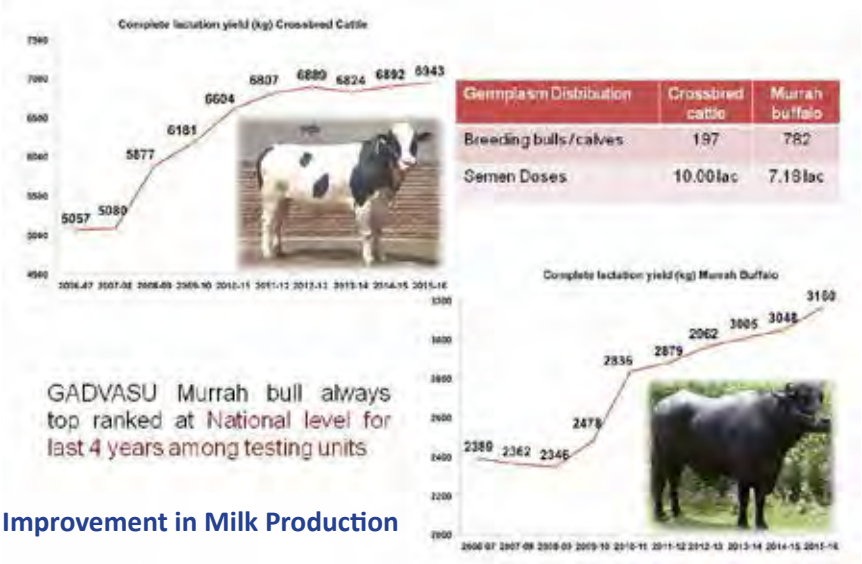
Veterinary Polytechnic, Kaljharani

During the session 2015-16, the total students admitted in Veterinary Polytechnic, Kaljharani for Diploma in Veterinary Science and Animal Health Technology were 72. All the candidates admitted were male students.

Courses Taught

The diploma students were offered 12 courses in 1st Semester and seven courses in 2nd semester.

RESEARCH



Improvement in Milk Production

Undertaking need based research on different aspects related to production and health of various livestock species, poultry and fisheries forms an integral part of the mandate of the university. During the year 2015-16, a total of 115 new project proposals were submitted to various funding agencies, viz. University Grants Commission (4), Department of Biotechnology (21), Department of Science and Technology including SERB (15), Indian Council of Medical Research (10), Indian Council of Agricultural Research (43) and others (22).

During the year 2015-16, a total of 189 research schemes were operational in the university as detailed below:

Non-Plan Schemes	41
ICAR Schemes	43
UGC	29
Revolving Fund Schemes	05
DBT / DST & Other Schemes	41
RKVY Schemes	03
Total	**162**

Research Highlights

Livestock Farms

Cattle Breeding

Crossbreeding Project for genetic improvement of cattle maintained at Dairy Farm of GADVASU showed an upward trend in milk production traits. Average 305-day milk yield and peak yield was 4,648 kg and 24.6 kg, respectively with wet average of 13.23 kg. Average 305-day milk yield of elite herd, used for the production of future crossbred bulls, was 6,347 with the peak yield of 34.6 kg. Maximum 305-day milk yield and peak yield was 8,854.5 kg and 47 kg, respectively in the herd. Average age at first calving in crossbred cattle was 28.3 months. Forty breeding bulls/male calves, 15,200 doses of frozen semen and 1,163 doses of chilled semen were supplied to Gaushalas, farmers and other dairy development agencies.



Crossbred Cattle

Buffalo Breeding

Murrah: Genetic improvement of buffaloes is being done through progeny testing of bulls through All India Coordinated Research Project on Buffalo breeding. Average 305-day milk yield of general herd of buffaloes was 2,804kg with lactation milk yield of 3,235 kg. The 305-day milk yield and peak yield in elite herd were 3,319 kg and 16.9 kg, respectively. Maximum 305-day milk yield and peak yield was 4,321 kg and 22.5 kg, respectively. Bull No. M 2045 of Set no. 10 under Network Project on Buffalo Improvement (Main Unit) was ranked 2nd among all the progeny tested bulls of the set in the Network Project. In the 16th set, four buffalo bulls were selected under the Network Project on Buffalo Improvement. About, 15,963 doses of frozen semen and 1,163 doses chilled semen were supplied to farmers and other dairy development agencies for improvement of buffalo population. For breeding purposes, 18 buffalo breeding bulls/bull calves were sold to farmers and 5 breeding males were supplied to Department of Animal husbandry, Punjab. The semen of test bulls were supplied to 25 AI Centres adopted under Field Progeny Testing Project and daughters were ear tagged for future recording of milk production.



Elite herd of Murrah



Murrah Buffalo - P 2515
Lactation Yield - 4285 kg

Nili Ravi: The present herd strength of Nili Ravi Buffalo is 115 with 72 breedable buffalo. Average 305-day milk yield and complete lactation yield was 2,233 kg and 2,502 kg, respectively. One of Nili Ravi buffalo produced 2,637 kg milk in 305-day lactation length with peak yield of 15.5kg that is comparable to best yield of any of buffalo breeds.



Nili Ravi Buffalo

Poultry

Broiler Breeding: The commercial broiler (IBL-80) developed in the University has potential to attain average 6-week body weight of 1600-1700g with a feed efficiency of 1.9, and the mortality of less than five percent. The egg weight remained more or less static but egg production to 52 weeks of age significantly improved. The center has supplied around 20,000 commercial chicks in the current financial year from, University hatchery.

Quail Breeding: Average 5-week body weight of commercial crosses is about 190 g. Another strain of quails with white plumage was developed under name 'Punjab White Quail'. Average egg weight is about 13 g and these eggs are used for preparation of pickles. The university supplies eggs and 5-week old dressed quails.

College of Veterinary Science

Animal Genetics and Breeding

Breeding: The genetic and phenotypic parameters of crossbred animals and breeding value of sires were estimated using BLUP and LS methods for first lactation performance and milk constituent traits. Based on records of 579 crossbred cows maintained at University Dairy Farm, the results suggested that to improve milk productivity, selection of bulls should be done on the basis of daughters' first lactation performance and milk constituent traits.

Genetics: At university dairy farm, 100 Murrah buffaloes were screened for genetic variability in PRL and PIT-I genes using RFLP techniques for their association with economic traits and no polymorphism was revealed in the genes with respect to the population under study. Two indigenous poultry breeds viz. Aseel and Kadaknath and broiler strain IBL-80 maintained at Poultry Research Farm were evaluated for reproduction, growth, carcass and immuno-responsive traits and a negative phenotypic correlation was observed between immune-response with body weight in different breeds.

Animal Nutrition

Methane production potential of feedstuffs: Irrespective of cuts, rye grass had higher nutritional worth with lower methane production as compared to that produced by guinea grass. Under cereal brans, the methane production potential of rice bran, deoiled rice bran and wheat bran was assessed and it was concluded that rice bran had the lowest methane production potential, but considering all other parameters like digestibility of nutrients, VFAs production, ME availability and UDP content, wheat bran was considered as the best amongst the tested brans.

Nutritional status of lactating crossbred cows in central plane zone of Punjab state: Ninty seven rural dairy farm houses maintaining crossbred cows were selected from 41 villages of Ludhiana and Moga district. The roughage to concentrate ratio in the complete feed offered to crossbred cows was observed to be similar (55:45) in both districts. More than 80% farmers offered homemade concentrate mixture, 94% of farmers offered mineral mixture, while all the farmers offered salt to their crossbred cows. The CP, EE and TDN content in TMR were comparable to those recommended by NRC for lactating animals. It was concluded that crossbred cows in central plane zone were healthy and well fed, further improving the diet with respect to energy may boost the milk production.

Novel feed resources: Sugar beet pulp could be stored as silage by adding wheat straw @ 5% or wheat straw+ acidic additives.

Nutrition reproduction: Feeding higher UDP ration (34.5% of total CP) may be advantageous in improving the weight gain in crossbred heifers. More than 25% CP as UDP has no benefit as far as growing heifers are concerned, but 10% higher energy lowered the age of sexual maturity by 107 days.

Phytobiotics in poultry: Effect of inclusion of cinnamon, garlic powder and aloe-vera powder on the growth and meat quality of broilers as phytobiotic alternatives to antibiotic growth promoters indicated that cinnamon @ of 0.5% garlic powder and aloe vera powder @ of 1.5% each individually can be used as phytobiotic alternatives to antibiotic growth promoters in broilers.

Livestock Production Management

Various achievements made were, a) Standardization of covered and open space requirement for optimum performance and welfare of Beetal kids under stall fed conditions, b) Anaerobic biodegradation with rumen liquor inoculum to improve nutrient composition brewers dried grains for broilers feeding, c) Biodegraded brewers dried grains as a protein source for partial replacement of soybean meal in broiler production,

d) Coarse maize feeding to broilers to lower feed manufacturing cost and improves performance, and e) Passive cooling strategy with roof shading and gravity flow sprinklers as an alternate of fan pad mechanical cooling systems to alleviate heat stress in broilers.

Livestock Products Technology

Radical scavenging activity, minimum inhibitory concentration and antimicrobial activity assay of essential oils: Radical scavenging potential of Essential oils viz. Lemon Grass, Cinnamon and clove was assessed and ABTS (% inhibition) varied from 55-68. Their antimicrobial potential tested on nine entero-pathogenic bacterial cultures revealed that the zone of inhibition (mm) varied from 12-42 (LGO), 2-16(Clove oil) and 5-52 (Cinnamon oil) for various classes of microorganisms and MIC ranged from 0.05-0.30% (LGO) and 0.1-0.30 (Clove and Cinnamon oil).

Encapsulation of lemon grass essential oil (LGEO) in alginate microcapsulesby external gelation: Encapsulation efficiency of beads ranged from 98-99.4% on wet basis and from 30-75% on dry basis depending upon alginate and $CaCl_2$ concentration. The average release rate of LGEO per hour was found maximum for 3% alginate concentration.

Encapsulated lemongrass oil for extension on shelf life of emu meat nuggets: The developed nuggets had an extended shelf life up till 28 and 42 days under aerobic as well as MAP conditions, respectively without deterioration of sensory quality.



Different flavours of Egg Drink

Extended storage life functional meat products by incorporating bioactive phyto-extracts: Sapota (*Achraszapota*) powder at 4% level incorporation was found optimum based on sensory attributes during development of functional pork patties. The developed products have extended shelf life upto 42 days under modified atmosphere packaging and 28 days under aerobic packaging conditions.



Egg Bhurji Mix

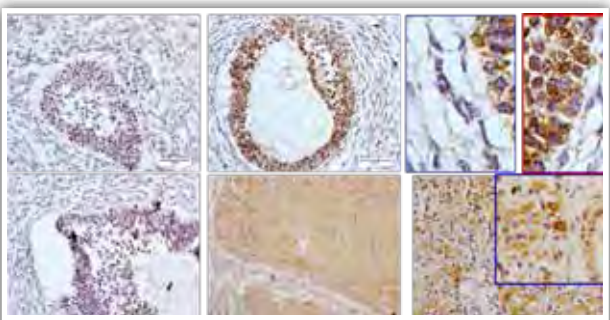


Egg Omelette Mix

Designer meat and egg products for health benefit and marketing: Process protocol were standardized for the development of various novel egg products such as egg soup mix, egg omlette mix, egg bhurji mix, egg drink concentrate, etc. These products were shelf stable at room temperature for more than 3 months.

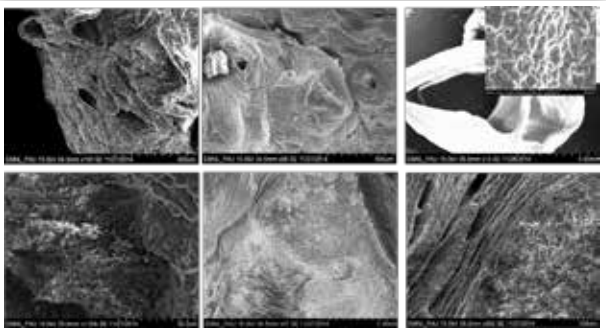
Veterinary Anatomy

Immunolocalization of Vascular Endothelial Growth Factor (VEGF) in ovary of buffalo: Strong immunostaining was observed both in nuclei and cytoplasm of the granulosa cells of preantral and antral follicles while weak cytoplasmic staining was observed in the theca cells. The immunostaining was prominently nuclear and was stronger in the large luteal cells compared to small luteal cells and endothelial cells.



Vascular Endothelial Growth Factor (VEGF) in ovary of buffalo

Electron microscopic studies on ovarian follicles and corpus luteum: Scanning electron microscopy revealed tertiary follicles were larger in size and found lined interiorly with large globular granulosa cells. Corpus luteum was surrounded by a thick connective tissue from which strands of connective tissue divides the stroma into incomplete lobe like structures. Number of blood vessels were seen in the connective tissue covering. Stroma of corpus luteum contained round, oval or polyhedral cells of large and small sizes that might be large and small luteal cells.



Scanning electron microscopy of ovarian follicles and corpus luteum

Immunohistochemical localization of estrogen and progesterone receptors in female genitalia of buffalo: In primodial follicles, ERα nuclear reaction was observed in one or two granulosa cells of the follicle. Similar to the primodial follicles, the ERα was localized the granulosa cells. The connective tissue around these follicles both in the superficial and deep stroma showed the strong reaction for ERα. In the growing follicle and secondary follicle the reaction was strong, while in the tertiary follicles weak reaction was observed in the granulosa cells and theca cells. ERα was weak or absent in the cells of corpora lutea. Progesterone receptors were localized in the nuclei of different groups of ovarian cells. PR was localized in follicular cells of pre-antral and antral follicles, stroma of ovary, endothelial cells of blood vessels.

Veterinary Gynaecology and Obstetrics

The salient research achievements were:

a) NMR investigations of cystic follicular fluid revealed metabolomic variations than normal preovulatory follicular fluid and UDP-G could be used as potential biomarkers in cattle suffering from cystic ovarian follicles.

b) The transvaginal ultrasound guided cyst ablation can be considered as an alternative to hormones for the treatment of cystic ovarian follicles.

c) In an attempt to propagate the elite Sahiwal cattle, two elite Sahiwal cattle were super-stimulated and flushed with recovery of 18 embryos and following transfer of embryos in 7 synchronized recipients cows three became pregnant (pregnancy rate = 42.8%). In another trial to conserve elite Sahiwal, superovulatory protocol was subjected to 3 elite Sahiwal cows and 25 embryos were recovered and 10 embryos were cryopreserved (3.33 average freezable embryos) in LN_2.

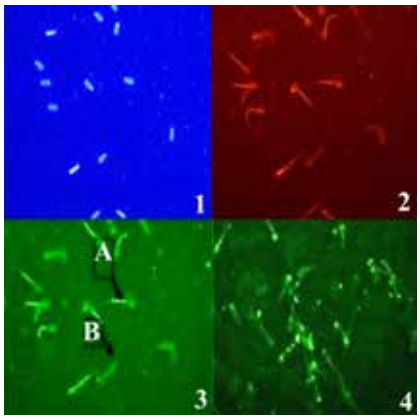
d) Treatment of neat semen with purified seminal plasma heparin binding proteins and a 31 kDa protein (IL-6) before cryopreservation minimized the cryo-injury by decreasing the generation of reactive oxygen species.

e) Effects of altering cooling rates in critical temperature range to improve frozen semen quality revealed that the best frozen semen quality was obtained with freezing curve showing 30 °C/min cooling rate from 4 to-15°C temperature range, 40 or 50°C/min from-15 to-60°C temperature range and 50°C/min from-60 to-140°C temperature range.

f) Fertility associated metabolites in crossbred bulls for identification of high fertility bulls with variable importance in projections (VIP) scores >2 were citrate (2.50 ppm) and tryptamine/taurine (3.34 ppm) in the seminal plasma; and isoleucine (1.14 ppm), asparagine (2.94 ppm) in the serum. Heat map analysis of metabolites indicated that citrate was lower and tryptamine/taurine was higher in seminal

plasma of high fertility bulls. On the other hand, isoleucine / leucine and asparagines were lower in serum of high fertility bulls. These metabolites showed identifiable peaks in NMR spectra, and thus can be used as biomarkers for fertility in breeding bulls.

g) Bcl–2 protein was supplemented (5 µM) in semen extender to evaluate the anti-apoptotic effect in buffalo bull sperm following cryopreservation at ultra-low temperature and improved post thaw semen quality indicated by higher viability, HOST reactive sperms, and sperm with low PLA activity (non-apoptotic sperms) as compared to control. Thus, Bcl-2 protein supplementation had protective effect on spermatozoa against apoptosis like changes induced during cryopreservation.

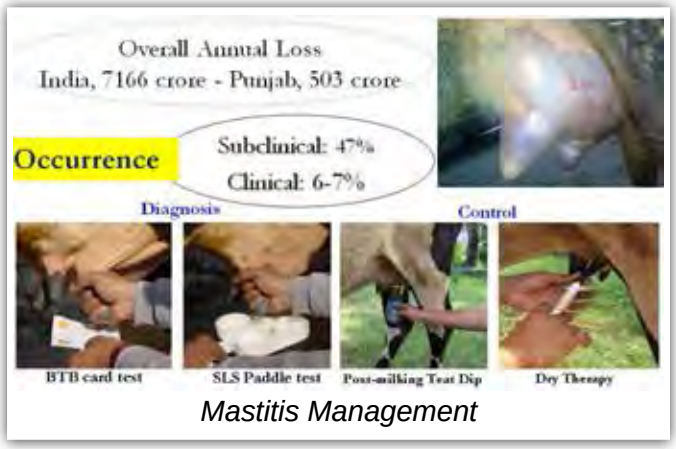


1) Sperm nucleus stained with DAPI, 2) Sperm mitochondria stained with TMRM, TRITC filter, 3) A. High mitochondrial potential B. Low mitochondrial potential, 4) Sperm plasma membrane stained with Bodipy C11, FITC filter

Veterinary Medicine

Current culture sensitivity pattern of clinical mastitis in state: Organisms isolated from the affected quarters comprised, in overall for cows and buffaloes, coagulase-negative staphylococci 60.17%, *Staphylococcus aureus* 26.88%, Pseudomonas and Gram negative spp. 7.94% and *Streptococcus* spp. 5.0%. Testing of isolated bacteria for drug sensitivity revealed, in overall, Ceftriaxone-tazobactam as the most effective drug (83.96%) followed by Ceftrioxone-salbactum (82.07%) and amoxicillin-sulbactam (75.46%). On the other hand, least effective drugs were Penicillin (20.78%), Ampicillin (29.66%) and Amoxicillin-clavulnate (38.73%).

Supply of mastitis diagnostic kits and analysis of milk samples for SCC: During last year, about 200 mastitis diagnostic kits were supplied. Besides milk samples received from dairy industry were analyzed for somatic cell count.



Mastitis Management

Epidemiological study on goat mastitis in north-western states of India: Average prevalence of sub-clinical mastitis in goats was 21.80% at animal level and 14.56% at quarter level. The quarters affected with specific, non-specific and latent infection were 9.72%, 6.13% and 7.98%, respectively. Among goats with intramammary infection, 78.82% had unilateral infection. The prevalence of IMI in left and right half udders were 52.36% and 47.64%, respectively. Overall, 18.32% udder halves were bacteriologically positive which comprised 58.42% from specific subclinical mastitis and 41.58% from latent infections. The organisms isolated from specific subclinical mastitis constituted coagulase negative staphylococci (CNS, 82.16%), coagulase positive staphylococci (CS, 17.84%).

Improvement of udder health and milk quality through application of mastitis control programme under field conditions: Pre-milking udder preparation included 4 steps i.e. washing and cleaning of teats with single serve paper towel; fore-stripping; application of pre-dip (Keno TM Pure); and cleaning and drying of teats with single serve paper towel before attaching the milking machine. Analysis showed that application of good pre-milking udder preparation could reduce the occurrence of specific SCM from 21.3% in pre-treatment phase to 10.5% at the end of trial. The evaluation of pre-milking udder preparation in terms of milk quality indicated that the mean cow composite milk SCC in cows under treatment was significantly

reduced from 1009 to 501 (× 10^3 cells/ml) between pre and post treatment phases.

Iodine deficiency studies in dairy animals in sub mountainous regions of Punjab: Based on the geographical locations viz., Sub Mountainous Districts (Zone-I), Central Districts (Zone-II), and Southwestern Districts (Zone-III), 89.3% cows and 95.24% buffaloes of Zone-I; 89.5% cows and 83.1% buffaloes of Zone-II; 52.0% cows and 73.91% buffaloes of Zone-III had deficient levels of plasma inorganic iodine with mean PII levels well below the critical level of 104.9 ng/ml. Similarly, 95.0% sheep and 98.15% goats of Zone-II; 86.67% sheep and 85.71% goats of Zone-III had deficient plasma inorganic iodine with mean PII levels well below the critical level of 100 ng/ml.

Fluorosis in dairy animals: In the South West Punjab, fluoride (@ >1ppm) is responsible for causing fluorosis, which is manifested by dental mottling and bone disease in dairy animals. Mean F concentration in drinking water of Mansa region was 2.16 ppm. It was observed that 30.3% samples had high F contents (>1.0 ppm), however, in only 18.3% samples, the F levels were high enough (>2.5 ppm) to produce clinical fluorosis in animals. Highest F content was found in the drinking water of budhlada block (i.e. 3.47±0.71 ppm) as compared to Mansa block where the F content was 0.93±0.11 ppm. Buffaloes were subjected to defluoridated (Nalgonda technique) drinking water for period of 90 days and plasma and urinary F excretion decreased progressively with the advancement of the treatment. Improvement in the general health of the fluorotic buffloes was observed and none of the buffaloes under the treatment group suffered from stiffness and lameness.

Infectious diseases of small ruminants in Punjab: Of the 103 serum samples with an abortion history, collected from 59 farms, 41 samples (39.8%) were positive for one organism; mixed infections were observed in 28 (27.2%) animals while 34 (33.01%) did not reveal antibodies to any of the agents tested. The farm wise (n=59) prevalence for *Brucella* sp., *B. ovis, C. abortus, T. gondii, N. caninum* and *C. burnetii* was 35.6%, 5.1%, 49.1%, 15.2%, 20.3% and 10.1% respectively. An overall apparent prevalence of 2.79% for contagious agalactia was observed, without any significant association with species, sex, feeding pattern, stage of lactation, and age of animals. Higher prevalence was observed in submountainous zone (5.56%) as compared to central districts (3.01%) and south-western districts (1.47%). The overall apparent prevalence of bluetongue disease was 52.99%. The seroprevalence of bluetongue in (central region-64.39%) was significantly higher as compared to submountainous region (51.85%) and south-western region (45.05%).

Veterinary Microbiology

Molecular characterization of Mycobacterium avium paratuberculosis: Five of 80 plasma samples and seven of 128 milk samples from cattle and buffaloes were positive for the presence of antibodies against MAP. However, none of the milk sample was positive by PCR and Real time PCR using TaqMan Assay.

Molecular detection of Mycobacterium bovis targeting esx A (ESAT-6) and esx B (CFP-10): Tissue samples from lung and mediastinal lymph nodes from cattle and buffaloes suspected to be died of TB on the basis of history of chronic cough and emaciation were subjectd to DNA extraction and then conventional PCR was done for the diagnosis by targeting esxA gene (ESAT-6) and esx B gene (CFP-10) present in the RD1 region of the genome of M. bovis. This study indicated the diagnostic potential of esx A gene (ESAT-6) and esxB (CFP-10 protein) in the diagnosis of bovine tuberculosis.

Multiplex PCR assay for Brucella, Leptospira, Listeria and Mycoplasma associated with reproductive disorders in cattle and buffaloes: Four pairs of oligonucleotide primers chosen to amplify target DNA regions viz. 31kDa MEM protein in Brucella, 16S rRNA gene in Leptospira, hlyA gene in Listeria and 16S rDNA in Mycoplasma spp. produced amplicon sizes of 223-bp, 331-bp, 456-bp and 270-bp, respectively. The sensitivity of multiplex PCR assay was 116pg. By multiplex PCR, out of 30 samples, nine samples of uterine

discharges were positive only for Mycoplasma and one sample of foetal stomach content was positive for Brucella, Leptospira and Mycoplasma.

Evaluation of different serodiagnostic tests for bovine brucellosis: Four different serodiagnostic tests Rose Bengal Plate Test (RBPT), Microagglutination Test (MAT), Competitive ELISA (c-ELISA) and Indirect ELISA (I-ELISA) were evaluated for diagnosis of bovine brucellosis. Serum samples from a total of 538 animals (cattle and buffaloes) comprising of B. abortus S19 vaccinated animals (n=265) and animals with unknown history of vaccination (n=273) were tested for the presence of antibodies against Brucella spp. In B. abortus strain 19 vaccinated animals, the percentage of animals positive by RBPT, MAT, I-ELISA and C-ELISA were 7.92%, 8.30%, 13.58% and 4.9% respectively. In animals with unknown history of vaccination, the corresponding values were 36.99%, 37.72%, 40.29% and 35.16%, respectively. The sensitivity and specificity values of RBPT, I-ELISA and C-ELISA with respect to MAT were 72.73% and 97.94%; 77.27% and 92.18%; 50.00% and 99.18% respectively in vaccinated animals. The sensitivity and specificity values of RBPT, I-ELISA and C-ELISA with respect to MAT in animals with unknown history of vaccination were 87.38% and 93.53%; 93.20% and 91.76%; 82.52% and 93.53% respectively.

Isolation and molecular characterization of Brucella abortus: Four isolates of Brucella abortus obtained from 100 clinical samples of foetal stomach contents, vaginal mucus and uterine discharges were characterized biochemically and by molecular assays. The isolates were confirmed as Brucella spp. by PCR using B4/B5 primer pair and as B. abortus by Bruce Ladder multiplex PCR. Amplicon size of 223 bp was obtained in all the four isolates by PCR using B4/B5 primer pairs. An amplified product size of 1682 bp, 794 bp, 587 bp, 450 bp and 152 bp was obtained by Bruce Ladder PCR for B. abortus. By Hinic Real-time PCR, all the four isolates were confirmed as Brucella spp. with Ct values between 14-16. Out of 100 clinical samples, DNA was extracted directly from 40 clinical samples of foetal stomach contents, vaginal mucus and uterine discharges. Two samples were positive by PCR using B4/B5 primer pair, three samples were positive by Real-time PCR and none of the samples was positive by Bruce Ladder PCR.

Canine Parvovirus: Incidence of CPV by PCR and NPCR was 11% and 50%, respectively indicating NPCR to be more sensitive. For the rapid detection of different antigenic types of CPV, a multiplex real-time PCR was designed using fluorescence probe-based real-time PCR assay. The most prevailing antigenic type was CPV-2a. Phylogenetic analysis indicated that the samples were forming a separate clad with that of vaccine strains. When the samples were compared with the world and Indian isolates it was observed that samples formed a separate node indicating regional genetic variation in the CPV.

Haemorrhagic Septicemia: Four samples were positive for haemorrhagic septicaemia by PCR, real time PCR and by LAMP. The samples were also confirmed positive by isolation of the *Pasteurella multocida* from these samples on blood agar. The isolates were sensitive to to cephotaxime, ceftriaxone, chloramphenicol, enrofloxacin, gentamicin, pefloxacin, and spectinomycin and resistant to penicillin. The *ptfA* gene of *P. multocida* type B:2 (strain P52) was got sequenced and accession number LC075578.1 was obtained from NCBI. The predicted *ptfA* nucleotide sequence revealed a homology of 79.81-99.80% with the reference strains. The amino acids sequence of the deduced protein was having a homology of 73.10-100% with the reference strains. The *ptfA* gene was successfully cloned and expresses in prokaryotic expression vector. The r-PtfA protein was purified and detected by SDS-PAGE as recombinant fusion protein having an estimated 16 kDa ptfA protein. Furthermore, the recombinant-protein was confirmed by Dot-blot using anti-His-tag protein mouse monoclonal antibody as primary antibody and anti-mouse-IgG-HRP conjugate as secondary antibody

Research on mycotoxins and mycotoxigenic fungi: Total 129 (102 were cattle feed and 27 were poultry feed) feed samples were collected from various districts of Punjab and were analyzed initially for presence

of aflatoxins by pressure mini column (PMC) and 53 samples were positive. The level of aflatoxin was in the range of 25 ± 25 ppb to 600 ± 25 ppb. Multi-mycotoxin screening method was employed on 100 feed samples for detection of different mycotoxins. The results revealed the occurrence of aflatoxin B_1 to be highest (53%) followed by sterigmatocystin (28%), ochratoxin A (24%) and citrinin (19%). The levels of aflatoxin B_1 was in the range of 25-600 ppb, while that of sterigmatocystin, ochratoxin and citrinin were in the range of 50-400 ppb, 50-400 ppb and 50-200 ppb, respectively. Fifty three (53) feed samples were cultured on SDA and *Aspergillus* spp. were isolated from 23 feed samples. Molecular detection of aflatoxin/ sterigmatocystin producing strains of *Aspergillus* was carried out by multiplex PCR and real time PCR. The *nor-1* and *omt-1* genes were targeted which are involved in the aflatoxin biosynthesis.Multiplex PCR and Real time PCR detected 6 cultures as aflatoxin/sterigmatocystin producing strains of *Aspergillus.*

Veterinary Parasitology

Multiple mutations in acetylcholinesterase (AChE)-3 gene associated with organophosphate resistance in Rhipicephalus (Boophilus) microplus ticks: Resistance to malathion was detected in 12 isolates among which 11 showed level I resistance status while level II status was recorded in one isolate. A significantly higher level of percent uninhibited AChE activity was recorded in all field isolates (36.36 ± 0.46 to 43.77 ± 1.21) in comparison to the susceptible population (29.39 ± 0.40). Analysis of nucleotides and their deduced amino acids sequences of partial AChE3 gene revealed the presence of six amino acid substitutions (I48L, I54V, V71A, I77M, S79P and R86Q) among which three substitutions (V71A, I77M and S79P) were reported for first time globally. The PCR-RFLP assay with *Hae*III revealed the presence of restriction site corresponding to R86Q mutation in all the field isolates along with an additional restriction site in seven field isolates corresponding to V71A mutation.



Malathion resistance map of Rhipicephalus (Boophilus) microplus ticks in Punjab

Balantidium coli infection in dairy animals: A total of 2089 faecal samples of dairy animals (956 buffaloes and 1133 cattle) were collected from 21 districts of different agro-climatic zones of Punjab and examined for *Balantidium coli* parasites which revealed an overall prevalence as 8.09% and infection was marginally higher in buffaloes (8.99%) as compared to cattle (7.33%). Highest prevalence of *B. coli* in buffaloes was recorded in rainy season (9.70%) followed by summer (9.06%) and winter (8.36%) and the trend was also similar in cattle with highest incidence in rainy season (7.44%) followed by summer (7.31%) and winter (7.23%).

Risk factors associated with prevalence of coccidiosis in dairy animals: An overall prevalence rate of 32.17% (672/2089) was recorded for coccidiosis in dairy animals with a significantly higher infection rate in buffaloes (35.46%) in comparison to cattle (29.39%). The prevalence of coccidiosis in cattle and buffalo population was associated with various risk factors viz. districts, agro-climatic zones and seasons.

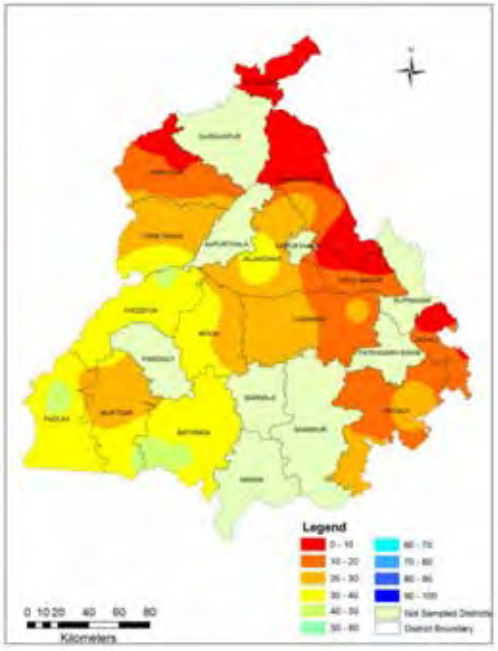
Deltamethrin resistant Hyalomma anatolicum: Resistance status against deltamethrin was assessed in *Hyalomma anatolicum* ticks collected from seven districts of western zone of Punjab using Larval Packet Test (LPT). On the basis of RR_{50} values, level I resistance status was recorded in three field isolates (Ferozepur, Muktsar and Sangrur) and level II in four isolates (Barnala, Bhatinda, Mansa and Moga). Esterase profile of

the tick larval extracts using native PAGE, revealed 5 bands of esterase activity designated EST-1 to EST-5. A strong correlation was recorded between the resistance ratios against deltamethrin and enzyme ratios (α-esterase and GST) of various field isolates of *H. anatolicum* indicating their possible role in resistance development.

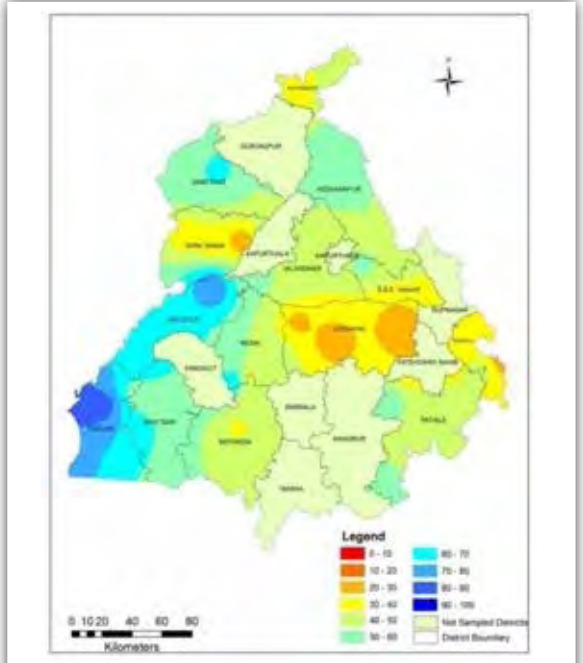
Risk factors associated with prevalence of strongyle infection in equines: A total of 311 equine faecal samples (190 horses and 121 mules) collected from six districts of Central Plain Zone, Punjab were examined using standard coprological methods.The results showed an overall prevalence of 27.33% for strongyles with rare to mild type of infection. About 56% and 46% of horses and mules, respectively, were positive for small strongyles (Cyathostomes). Amongst the large strongyles, highest proportion was recorded for *Strongylus vulgaris* whereas, *S.equinus* was found in least proportion.

Theileria equi and Babesia caballi infection in equines: Overall prevalence of 14.14% and 0.0% of *T. equi* and *B. caballi* was recorded by multiplex polymerase chain reaction, and 75% and 1.11% by competitive enzyme linked immunosorbent assay. Only two animals with positive antibody titer from *B. caballi* and none with PCR indicated *T. equi* as the predominant haemoprotozoa responsible for equine piroplasmosis in the study area. The study has demonstrated the possible absence of *B. caballi* in both conducive and non-conducive areas of Punjab and demonstrated *T. equi* as the potential agent of equine piroplasmosis in Punjab.

Epidemiological survey of T. equi based on nested PCR assays and indirect-ELISA: Endemicity of equine piroplasmosis caused by *Theileria equi* was confirmed by nested PCR and equine merozoite antigen-2 (EMA_2) indirect-ELISA based on analysis of 464 equids (426 horses and 38 donkeys/mules) in Punjab. The spatial distribution analysis revealed an increasing trend of *T. equi* prevalence from north-eastern to south-western region of Punjab by both the techniques correspondingly, which proffered a direct relation with temperature and inverse with humidity variables. In unfavourable or limited resource conditions, Whatman FTA elute micro cards, a time effective source for obtaining parasitic DNA with excellent detection limit, coupled with highly specific PCR assay would be the most promising diagnostic approach for *T. equi* infection.



Predicted geographical distribution ranges of Theileria equi by nested PCR



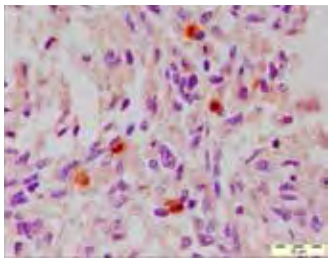
Predicted geographical distribution ranges of Theileria equi by Indirect-ELISA

Veterinary Pathology

Sero-prevalence of diseases affecting reproductive tract of pig: Recorded as Brucellosis 12.5%, Porcine Parvovirus (PPV) 41.1%, Porcine circovirus2 (PCV2) 24.4% , Porcine reproductive and respiratory syndrome (PRRS) 22.2%. Immunohistochemistry is most sensitive technique for diagnosis of infectious agents (Porcine brucellosis, PPV, PCV2) associated with reproductive tract of swine which supplements the gross and histopathological alteration of the disease. Immunohistochemical examination revealed positive immunoreactivity for *Brucellasuis*, PPV and PCV2. Placental cotyledons showed positive immunoreactivity for *Brucella suis*, PPV and PCV2 and should be submitted for diagnosis of abortion in swine.



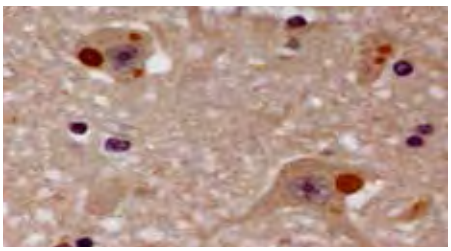
Aborted and Dead Piglets due to Porcine Parvovirus



Placenta showing positive cells for Porcine parvovirus by IHC

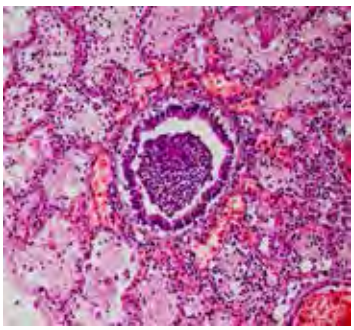
Sero-prevalence of diseases affecting respiratory tract of pig: Seroprevalence of Mycoplasmosis, Pasteurellosis and PRRS in Punjab was 20%, 25.5% and 22.2% respectively. Characteristic histopathological lung lesions can be used for tentative diagnosis of various respiratory diseases and needs to be supplemented by other immuno diagnostic tests.

Rabies: There is prevalence of only genotype-1 of Rabies virus in the representative domestic and wild species. There is deviation of isolates of Punjab from the clusters of isolates of other rabies viruses of Indian origin. In comparison to other countries, the isolates of Punjab are closer to the isolates from Pakistan. Molecular approach viz. HnRT-PCR, as compared to RFLP and sequencing, renders prompt and easier epidemiological study of rabies. Rabies Immunogen Detection Assay (RIDA) is more effective than IHC for detection of rabies. The results suggests that IHC, RIDA, HnRT-PCR and qPCR can be used as supplementary diagnostic tools for detecting rabies virus.

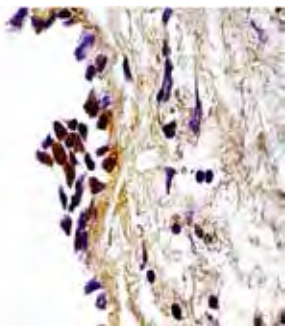


Immunohistochemical localization of Negri bodies

Respiratory Diseases of bovine: Sero-prevalence of various viral respiratory disease(s) viz. infectious bovine rhinotracheitis (IBR) 38.50% (72/187), Bovine respiratory syncytial virus (BRSV) 47.05% (82/187) and PIV3 27.81% (52/187) in Punjab state. Risk factors such as age and herd density size were important significant determinant factors, in viral disease seroprevalence. In viral etiology cranio-ventral distribution was primarily observed. However, necrotic lung lesions with or without abscess were suggestive of Mycoplasma and *Pasteurella multocida* infection. Immunohistochemical examination of pneumonic lung showed immunoreactivity for *Pasteurella multocida*, *Mycoplasma bovis*, BRSV, PIV3 and Mycobacterium.



Histopathology slides showing bronchopneumonia in bovines



IHC: Cells showing positive signals for Mycoplasmosis in bovines

Veterinary Pharmacology and Toxicology

Antibacterial efficacy of commonly used antibacterials: The disposition of a long acting formulation of enrofloxacin (Flobac®SA) in buffalo calves was administered at the dose rate of 7.5 mg.Kg-1 body weight

through intravenous and intramuscular route. It was concluded that enrofloxacin preparation can be used to combat bacterial infections in buffalo species. Disposition of lincomycin after intravenous administration at dose rate 10 mg/kg body weight was investigated in febrile (*Echerichia coli* endotoxin– induced) goats. Based on results, lincomycin in fever is suggested to be repeated at 24 h interval for that organism which are sensitive to lincomycin having MIC up to 0.1 µg/mLand at 12 h interval for bacteria having MIC of 0.6 µg/mL.

Therapeutic potential of some indigenous plants: Fresh leaves of *Murraya koenigii* (curry leaves) were collected and extracts of powdered leaves were prepared using solvents of various polarities. The antibacterial activity was evaluated by well diffusion method against gram-negative bacteria i.e. *E. coli* and no antibacterial activity of curry leaves was recorded against *E.coli*. The anti-inflammatory activity was determined and inflammation subsided after 3.3 h in case of methanolic extract group, whereas, it took only 2.5 h in group administered methanolic extract in emu oil. This was comparable with the standard drug used to treat inflammation that took 3 h. The anthelminthic activity was evaluated *in vitro* against adult female *Haemonchus contortus* worms and the worms were completely immobilized by methanolic extract at concentration of 16.0 mg/ml with percent mortality of 66.67 %. All other extracts were found to be ineffective.

Nitrite toxicity: Sub-chronic toxicity of sodium nitrate (@ 4.5 mg/kg/day for 90 consecutive days) in buffalo calves produced significant decrease in plasma total proteins (14.9%), an increase in plasma aspartate aminotransferase (21.3%), alkaline phosphatase (15.5%), gamma-glutamyl transpeptidase (44.9%), lactate dehydrogenase (26.7), glucose (35.7%), cholesterol (13.6%) and creatinine (27.0%).

Toxicity studies on insecticides: Toxic effects of flubendiamide sub-acute exposure were analyzed on hematology of rats. Many changes were dose independent, but sex specific. This lead to the hypothesis that saturation toxicokinetics might be one of the reasons for this varied response, which can only be evaluated after further testing.

Toxicokinetics of pyrethroids: Oral subacute toxicity of bifenthrin was induced in buffalo calves by daily oral administration of bifenthrin at the dose of 5.0 mg/kg/day for 21 consecutive days. It resulted in mild symptoms of toxicity accompanied by significant changes in the biochemical and haematological profile of the animals. In buffalo calves, repeated oral exposure to Cypermethrin @ 0.5 mg/kg/day for 21 consecutive days resulted in marked changes in the antioxidant profile, marked alterations in the biochemical paramaters and significantly disturbed the haematological homeostasis.

Pesticide-induced adverse effects on livestock production: *In vitro* cytotoxicity and oxidative stress potential of aldrin was evaluated on BALB/c 3T3 mouse fibroblast cells. The result of present study suggested that increase in lipid peroxidation and decrease in activity of antioxidant defence via oxidative stress by aldrin in BALB/c 3T3 cells were responsible for cytotoxicity.

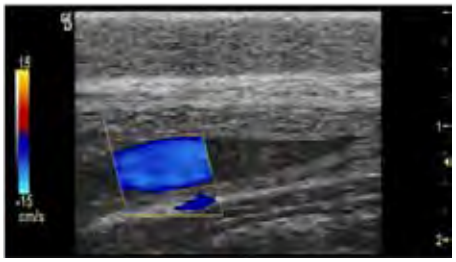
Ameliorative measures for enrofloxacin-induced testicular toxicity in rats: The effect of enrofloxacin and its co-administration with α-tocopherol on sperm count, live sperm count and sperm abnormalities in different groups of rats was done. Administration of enrofloxacin along with α-tocopherol resulted in partial recovery in sperm count and attenuated enrofloxacin induced sperm abnormalities.

Veterinary Physiology and Biochemistry

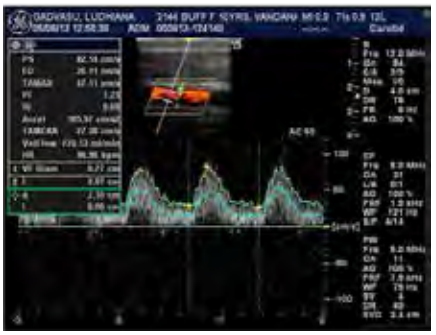
Role of Fibronectin binding outer membrane proteins of Pasteurella multocida in extracellular matrix (ECM) adhesion and pathogenesis: The Fibronectin from buffalo plasma has been isolated and characterized utilizing Gel filteration, Gelatin, heparin affinity chromatography, polyacrylamide gel electrophoresis (PAGE) and western blotting. Outer membrane Proteins of Pasteurella isolates have been isolated and characterized in polyacrylamide gel electrophoresis. The binding studies performed by ELISA with the buffalo fibronectin and serially diluted Pasteurellaisotypes have revealed affinity of isolates to fibronectin..

Veterinary Surgery and Radiology

Colour doppler in veterinary patients: Study was conducted on cattle and buffaloes to study the normal Doppler characteristics of major blood vessel like external jugular vein, common carotid artery, cranial epigastric vein, tarsal vein, caudal vena cave and portal vein and the changes associated with disease conditions. The database for normal doppler parameters were established and significant changes in blood flow characteristics in diseases like diaphragmatic hernia, intestinal obstruction and pericarditis were recorded.

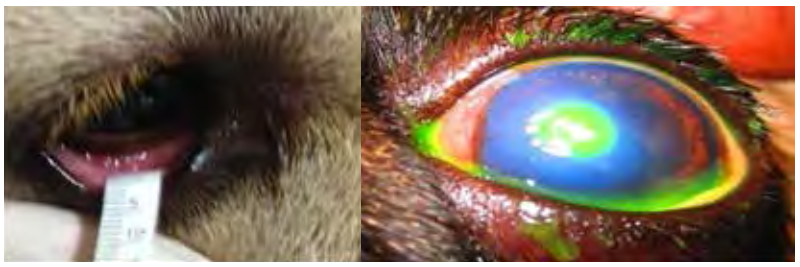


Color flow scan of healthy EJV with uniform color flow



Spectral display of CCA in healthy buffalo

Ophthalamic diseases of veterinary patients: In clinical cases of cataract in dogs, phacoemulsification technique was used to remove the cataractous lens and foldable PMMA intraocular lens of power +41 D was used with good results. Twenty eight animals were operated for IOL implantation. Good recovery leading to regaining of vision was found in 15 animals. Also, corneal ulcers were treated in 28 animals. The diagnosis of the condition was made from visual examination and florescein dye test. Dryness of the eye was measured by Schirmer's tear test. Disease was having high incidence in breeds having bulging eyes e.g. Pug breed of dogs. Grid and punctate keratotomy conjunctival grafting and amniotic grafts were used for the management of corneal ulcers in dogs. These techniques resulted in good healing of the ulcer area and saved the vision of eye.



Diagnosis of Corneal Ulcer by visual examination and florescein dye test

Equine colic: Animals were anaesthetised usingpremedication with Xylazine (1.1 mg/Kg, IV), administered 5 minutes prior to anesthetic induction with Ketamine (4-5 mg/Kg, IV) plus Midazolam @ 0.02mg/kg followed by isoflurane inhalant anesthesia in a partial rebreathing circuit. Anaesthetic regimen was found to be satisfactory combination as it resulted in good analgesia with excellent muscle relaxation. Pre-operative blood lactate, PCV, TLC were important prognostic indicators for colic patients. Ventral midline celiotomy provided proper visualization of intestinal lesion and helped in removal and drainage of the obstruction. Foleys catheter as an indwelling peritoneal drain, lateral to incision line, had a potential advantage in draining peritoneal fluid and collection of peritoneal fluid for analysis. Post-operative ultrasonography was reliable in assessment of intestinal peristalsis and volume of peritoneal fluid. Assessment of peritoneal fluid protein and its lactate levels along with cytology were reliable in post-operative assessment in abdominal surgery. Abdominal support bandage was helpful in preventing wound



Colic surgery in horse

dehiscence, edema formation and abdominal hernias. Lignocaine as a prokinetic drug helped in preventing the paralytic ileus post-operatively. The results will help in early diagnosis of equine colic patients fit for surgery and successful surgical treatment.

Orthopaedic surgery: In large animals, use of interlocking nailing for the long bone fracature fixation was performed. Five animals with femur fracture, 7 with tibia fracture and 2 animals having humerus fractures were treated by static intramedullary interlocking technique. Satisfactory fracture stablity was achieved and early weight bearing was seen in all the animals. End threaded pins were used for the repair of distal bone fractures in small animals. Application of C-Arm for minimally invasive fracture repair in dogs is being used routinely for the placement of interlocking nails for the fixation of femur fractures in dogs. Use of minimally invasive bone plating for the repair of radius ulna fractures in dogs was standardised.

Bovine intestinal disorders: Left flank approach gives comparable results that of right flank approach for surgical treatment of animals suffering from intestinal fecoliths and caecal dilatation. Ultrasonography combined with per rectal examination was useful in diagnosing caecal dilatation. High TLC, reduced potassium, reduced sodium in serum and high albumin in peritoneal fluid are considered as poor prognostic indicators in animals suffering from intestinal fecoliths and caecal dilatation in bovine.

Laparoscopic surgery: For the diagnosis of various abdominal affections like splenic tumors, abdominal masses, hepatic masses, ovarioectomy, prostatic abscess and retained testicular tumors. Thoracoscopy was done for diagnosis of thoracic masses in dogs.

Anaesthesia: Incorporation of muscle relaxants was useful in various abdominal and orthopaedic surgical procedures. Combination of butorphanol and Midazolam as preanaesthetic regimen and propofol and ketamine as induction and isoflurane for maintenance of general anesthesia has been adopted for routine use for large animals.



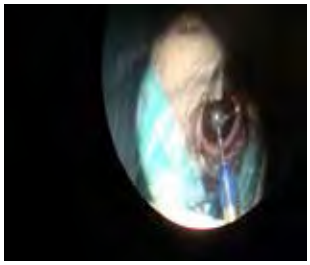
Laproscopic surgery in a dog

Success story - Cataract surgery:

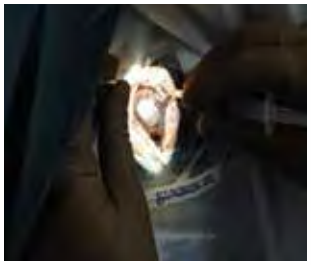
Department of Surgery and Radiology is the only unit in north India where cataract surgery followed by implantation of foldable intraocular lens is being performed and has been conducted in 28 dogs. Cataract was more in German Shephard, Labrador and Daschhund breeds of dogs. Out of the animals reported, 85% were male and 15% were female. Phacoemulsification with Intraocular lens implantation was performed in all the 28 dogs. Good recovery was seen in 15 animals and satisfactory regain of vision was achieved. In other animals, the vision though was not perfect but the animals were able to recognise the things and were able to walk normally. In large animals, removal of cataractous lens was performed under ophthalamic microscopic guidance in one cow and animal was able to see the things during postoperative period.



Dog with Bilateral Cataract



Phacoemulsification procedure



Fixing of eye ball while removing cataractous lens



Aphakic-postintracapsular cataract removal in cow

School of Public Health and Zoonoses

Zoonotic Diseases

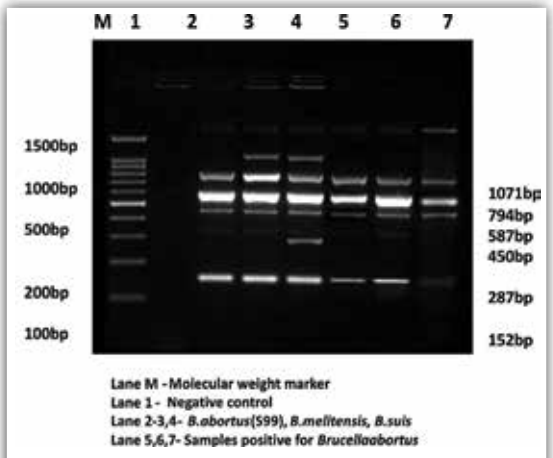
Brucellosis:

A total of 998 human samples were screened from various districts of Punjab. The initial screening by RBPT revealed 185 samples positive for *Brucella* agglutinins. Out of total samples tested by STAT, 149 samples were positive with titer of ≥ 80 IU. After subjecting the samples to ELISA, 117 samples were reactive to IgG antibodies and 45 to IgM. The main symptoms in human subjects recorded were PUO, biphasic fever, joint pains, lethargy, malaise etc.

A total of 981 blood samples were collected from cattle and buffaloes (909), goats (28), pig (30) and dog (14). 178 samples from cattle, 18 of the buffalo samples, 11 from goat and 3 dog sera samples were positive on RBPT testing, and 149 samples from cattle and 13 of buffalo samples were positive by ELISA.

Five (5) human and twelve (12) animals *Brucella* isolates were submitted to *Brucella* Repository at IVRI and confirmed by Bruce Ladder PCR.

Rapid Diagnosis and Treatment Follow up of human brucellosis by Real-Time Polymerase Chain Reaction revealed symptomatic improvement in 82% individuals after treatment, although weakness was a persistent symptom observed in individuals even after successful treatment.



Bruce Ladder PCR for speciation of Brucella isolates

Parasitic zoonoses

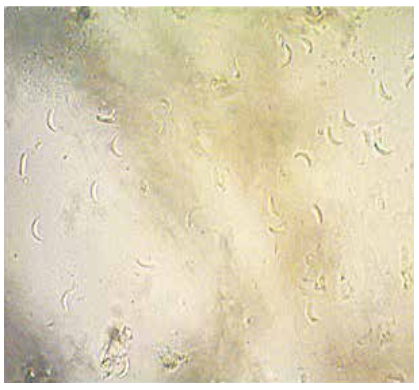
Sarcocystis cysts/zoites were recorded in 146 (58.4%), 169 (67.6%), 182 (72.8%), and 191 (76.4%) of samples by using intact cyst isolation, pepsin HCl digestion, conventional PCR, and qPCR-MCA, respectively. Molecularly, 1 *S. miescheriana* isolate and 6 isolates of the zoonotic species *S. suihominis* were recorded.

Sarcocystis cysts/zoites were recorded in 44% (95% CI 38–49%), 58% (95% CI 53–64%) and 68% (95% CI 63–73%) from both cattle and buffalo samples using intact cyst isolation, pepsin-HCl digestion method and conventional PCR, respectively.

537 pig carcasses were examined at different slaughter shops/ slaughter houses in Punjab, 15 were found positive for the presence of *C. cellulose* showing overall prevalence of 2.79 per cent. The prevalence was found to be significantly high in (5.11%) stray/free ranging pigs (11/215) reared under extensive management system as compared to farm pigs (1.35 %) reared under intensive management system.



Polymerase chain reaction of 18S rRNA gene of *Sarcocystisspp*. using primers 2L and 3H



Bradyziotes seen by pepsin digestion method in 40x light microscope

307 serum samples from pigs were collected, 20 samples were found positive on ELISA with an overall sero-prevalence of cysticercosis as 6.51%.

Economic impact of cysticercosis was analyzed. Neurocysticercosis resulted in a total of 2.10 million (95% UI 0.99–4.10 million) DALYs per annum without age weighting and time discounting with 1.81 million (95% UI 0.84–3.57 million) DALYs from the North and 0.28 million (95% UI 0.13–0.55 million) from the South. The health burden per thousand persons per year was 1.73 DALYs (95% UI 0.82–3.39). The results indicate that human NCC causes significant health and economic impact in India.

Food safety and quality assurance

Staphylococcus aureus in milk

Overall prevalence of *Staphylococcus aureus* in raw milk and milk products was found to be 14.43% and 3.33%, respectively.

Out of 26 farms analysed, *S. aureus* contamination was reported in 19 (73.07%) farms. There was no significant difference in the presence of *S. aureus* between small, medium and large farms (Chi square value=5.029; P=0.080).

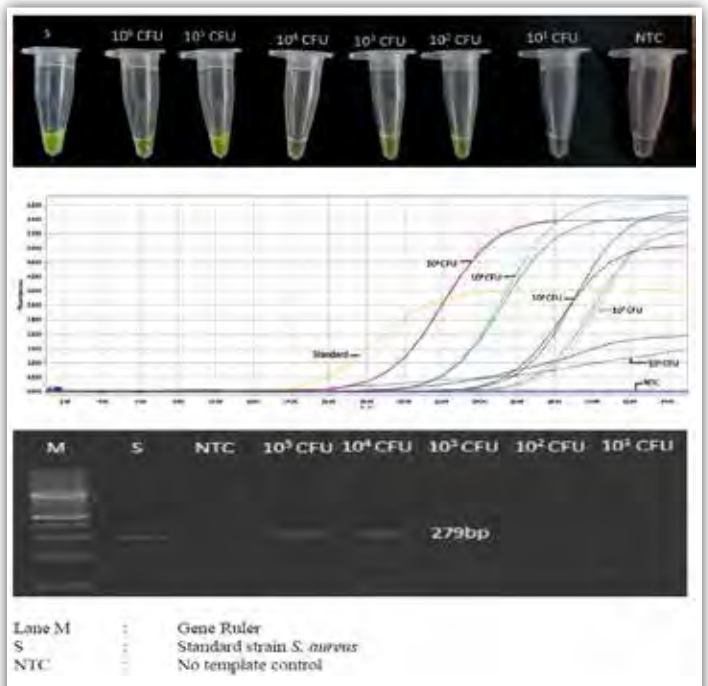
Out of 291 raw milk samples, 23 (7.90%) samples reported multidrug resistant (MDR) *S. aureus*. None of the milk products samples had MDR *S. aureus*.

Overall prevalence of MRSA in raw milk was 1.03% (3/291).

Rapid detection of *S. aureus* in milk

Optimized Loop Mediated Isothermal Amplification (LAMP), a rapid detection method was able to detect *S. aureus* in milk rapidly within 50 min excluding DNA extraction time andin1:35 h including DNA extraction time.

Optimized LAMP protocol had 87.5% detection sensitivity in comparison to culture method when applied to field samples with enrichment. The sensitivity was raised to 100% when negative samples were enriched for four hours. Detection limit was further increased to <10^2 CFU/ml.



Comparative sensitivity evaluation of LAMP, qPCR and PCR assay from milk by Kit DNA extraction method

E. coli and Poultry farms

Presence of extended spectrum beta lactamases (ESBL) in Poultry environment was more than 50% in Punjab.Presence of ESBL was more in broiler farm (79.6%) than in layer farm (22.9%)

Salmonella and Poultry farms

Prevalence of *Salmonella* in poultry fecal samples in Punjab is low (1%). All the isolates (6) showed resistance to one or more antibiotics.

Salmonella isolates (4) from one farm were of same serotypes (IIIa35:z24:z23), whereas other two isolates was untypable and also carried virulent gene (*spv*C).

All *Salmonella* isolates were clustered in two major clusters based on PFGE analysis.



Dendrogram showing the relatedness of Salmonella isolates from fecal samples

Environmental Pollutants

Pesticide and Antibiotic Residues

In this work, 706 milk samples were procured from different districts of Punjab. Out of 706 milk samples, 7,1,9,2 and 3 samples were found above maximum residue limits for lindane, pp-DDE, endosulfan, cypermethrin and chlorpyrifos, respectively. The comparative analysis of farm milk, animal feed and water results indicated the concentrate feed as the predominant source for occurrence of pesticide exposure to animals and release of residues in milk.

Milk samples from different sites of India were collected under a pan-India collaborative project with Public Health Foundation of India (PHFI). The sites in the study include peri-urban fringes of Ludhiana, Guwahati, Bangalore, Bhubaneshwar and Udaipur. A total of 25 samples out of 216 samples of Bangalore, 20 out of 258 samples of Ludhiana, 20 out of 270 sample of Guwahati and 24 out of 204 samples of Bhubaneshwar were found positive for pesticide residues.

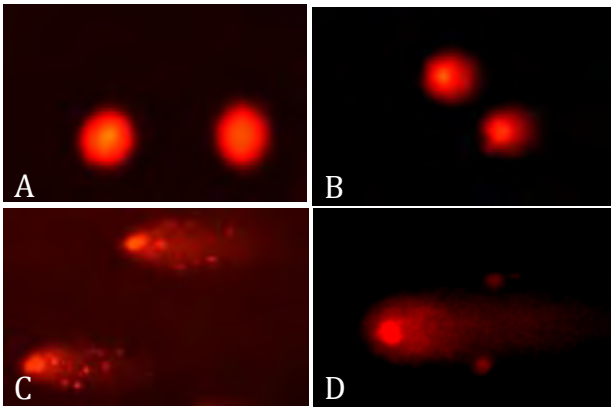
A study was designed to determine the antibiotic residues in poultry feed, water and eggs and evaluation of the managerial practices adopted by poultry farms in Punjab (India).Results revealed the presence of oxytetracycline, chlortetracycline, enrofloxacin and ciprofloaxacin residues in 8.6, 4.9, 4.9 and 2.5 % of the eggs samples, respectively. Most of the poultry farmers used antibiotics in feed and water destined for poultry. Consequently, residues of oxytetracycline, chlortetracycline were noticed in 12.9 and 2.9 % of feed samples, and enrofloxacin in 3.7% water samples.

The management practices adopted by farmers indicated that they neither follow withdrawal period for antibiotics given to birds nor separate the eggs either from sick birds or treated birds from rest of the eggs. Farm workers were not aware about the antibiotic resistance development, hazards associated with residues, maximum residue limits and acceptable daily intake issues with antibiotics usage.

Since resistance against certain antibiotics is emerging at high levels, thus there is a need of surveillance systems to ensure safety of food and implementation of strict legislations for regulation of antibiotic use to combat the antibiotic resistance.

School of Animal Biotechnology

Thermotolerance of Sahiwal and HF crossbred cattle: At 43°C, the expression of HSF-1 declined drastically in both Sahiwal and Crossbred (Holstein Friesian x Sahiwal). Sahiwal is considered more heat tolerant than crossbred because at 39°C crossbred was more susceptible to heat stress as it showed comparatively very high HSF-1 expression and as revealed in *in vitro* studies on PBMCs. There is a negative association found between Catalase and GSH and SOD and GSH. The MDA and GSH are directly proportional to each other.



Single cell gel electrophoresis of mice blood showing intact nucleus in control (A) and comets in Ethion (B), 184 LPS (C) and Ethion followed by LPS treatment (D) groups

Acute ethion exposure induces genotoxicity and immunotoxicity in mice: Ethion entry in food chain is an issue of one health perspective and there is no common agreementon genotoxicity of ethion. There was significant increase in comet tail length (µm) and tail DNA% of treatment group compared to control indicating genotoxic potential of ethion. Ethion resulted significant decrease in TLC accompanied by lymphocytopenia suggesting immunotoxicity. However,

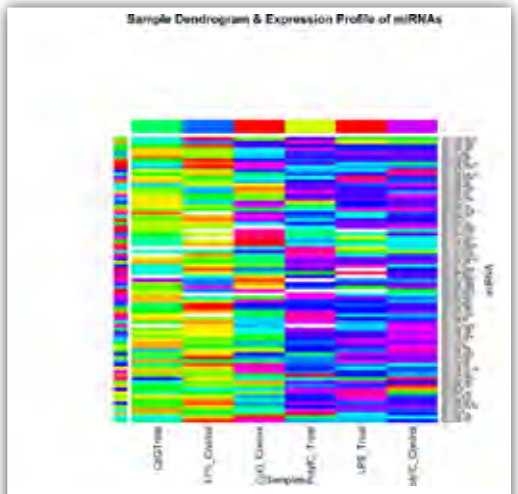
coexposure of ethion with LPS did not show any synergistic effect on genotoxic and immunotoxic potential of ethion.

Bubaline Dicer-I coding sequence: Cloned and studiedfor the first time in world. The evolutionary analysis indicates that miRNA genesis is constantly under the control of selection pressure due to selective evolution of the Dicer-I enzyme. The salient features of the whole study can be summarized as:

Total number of bubaline miRNA homologous to that of cattle	288
Total number of novel miRNA with no homologue in cattle	130
Total novel mature star miRNAs (no homologue in cattle)	36
Number of miRNAs uniquely expressed only in Brucella +Ve Murrah (but not in Control) vis-à-vis Healthy Murrah (but not in Brucella +Ve Murrah	45 & 19
Number of miRNAs uniquely expressed only in JD +Ve Murrah (but not in Control) vis-à-vis Healthy Murrah (but not in JD +Ve Murrah)	32 & 36
Number of miRNAs uniquely expressed only in Brucella +Ve Murrah (but not in Brucella-Nili Ravi) vis-à-vis Brucella +ve Nili Ravi (but not in Brucella +Ve Murrah)	67 & 12
Uniquely expressed miRNAs in LPS-challenged and un-treated-control	61 & 18
Uniquely expressed miRNAs in Poly I: C-challenged and un-treated-control	35 & 27
Uniquely expressed miRNAs in CpG-challenged and un-treated-control samples	52 & 20

Comparison of expression profiles of diseased and healthy buffaloes: a) ***Brucella +ve (Murrah) vs healthy control***: 3 miRNAs (miR-1434-5p, 200c, 139) upregulated; while 3 miRNAs (miR-152, 411a, 1463) down regulated, b) ***Brucella +ve (Nilli Ravi) vs healthy control***: 3 miRNAs (miR-188, 200c, 375) upregulated; while 2 miRNAs (miR-363, 454) down regulated, and c) ***JD +ve (Murrah) vs healthy control***: 3 miRNAs (miR-1434-5p, 2484, 2340) upregulated; while 3 miRNAs (miR-343, 27a-5p, 1260b) down regulated.

Comparison of expression profiles of TLR ligand stimulated and non-stimulated PBMCs: a) ***LPS stimulated vs control***: 4 miRNAs (miR-296, 29E, 130A, 132) Up-regulated, while 3 (miR-24A, 26A, 424) down-regulated, b) ***PolyI:C stimulated vs control***: 2 miRNAs (mir-449A, 495) upregulated; while 2 miRNAs (miR-1306, 186) down regulated, and c) ***CpG stimulated vs control***: 5 miRNAs (miR-1468, 29D, 23A, 23B, 363) upregulated; while 2 miRNAs (miR-362, 132) downregulated. A total of 14 differentially expressed miRNAs were found to have function in immune regulation and disease pathogenesis. miRNA Library for Inidan water buffalo (*Bubalus bubalis*) constructed and has been uploaded in GADVASU website (http://gadvasu.in/noticedetails.asp?J=0&id=785)



Sample dendrogram clustering samples and bubaline novel miRNAs according to co-expression patterns

Animal Disease Research Centre

A total of 21 outbreaks of different diseases viz FMD (10), theileriosis (1), babesiosis (2), rabies (1), aspergillosis (1),strongylosis and coccidiosis (1), nitrate toxicity (1), ephemeral fever (1), anaplasmosis (1), pneumonia with louse infestation (1) and brucellosis in goat (1) were attended and successfully controlled during this period. Theileriosis was reported from Ferozepur district. Out of a total of 300 cattle, 24 were affected and 5 cattle died. Two outbreaks of babesiosis were reported. One from Faridkot and another from Sangrur district, and in both districts, cattle were affected. An outbreak of anaplasmosis was reported from a cattle farm at Ludhiana. Out of total of 300 cattle in a farm 24 were affected and 5 died.

A total of 9 FMD outbreaks were attended from villages around Ludhiana. Out of a total population of 903 cattle and buffaloes of these villages, 423 animals were affected and 28 animals died of the disease. One outbreak was reported at Bathinda at village Maur and village Sandoha in the month of December. Out of 24 cattle and buffaloes 18 animals were affected and 6 had died. In majority of the outbreaks the animals had not been vaccinated against FMD.

At Noor Mahal Dera, Ludhiana, ducks were affected and were having injury on neck and were showing nervous symptoms. Post mortem examination revealed lice on external surface, blood clot on neck region, pneumonic lungs, congested liver, mottled spleen and catarrhal enteritis. In another outbreak at the same place a total of 650 cattle in the farm and 99% animals showed the lesions of tail gangrene. Diagnosis on the basis of isolation was that of aspergillosis.

Brain sample was submitted from Shadipur Momian, Patiala which was positive for rabies on the basis of FAT. Nitrate toxicity was reported from village Harnampura, Ludhiana. Out of a total of 40 buffaloes in the farm, four animals died suddenly.

A total of 507 bovine (cattle and buffaloes) were tested for brucellosis and 24 animals were found positive on the basis of Rose Bengal Plate Test (RBPT).

Centre for wild life studies and research

The centre for wild life studies and research is helping the zoo authorities on disease surveillance, health monitoring and management consultancy. The zoo animals suffer with variety of infectious, parasitic and non-infectious diseases. Due to the rigorous implementation of the Leptospirosis in the Felids is more or less under control now that was causing lot of problems few years ago. Yuvraj, a young lion of zoo who was in the critical situation at GADVASU because of hind limb paralysis and severe septicemia is perfectly normal after one month of the treatment.

At this centre efforts were made to use the non-invasive diagnostic techniques of infectious diseases caused by Mycobacterium, Salmonella, E coli, Leptospira, cryptosprodium etc in the free ranging and captive wild animals. Mycobacterium avium Paratuberculosis (MAP) is prevalent in free ranging wild animals and domestic livestock at wildlife-livestock interface in Abohar wildlife sanctuary. The frequency of isolation of E. coli was higher in captive animals as compared to the free range animals and there is sharing of serotypes between the animals and the environment. The prevalence and transmission of parasitic pathogen between wild animals and domestic livestock being studied to get an understanding about the sharing of these at the interface and come up with means and ways to minimize it.

Besides this studies were undertaken on water quality at zoo and possible risk to zoo animal health. In it the physcio-chemical and microbiological examination of the drinking water of the various sources of the drinking water of the zoo animals were studied. It is the first study of this type of the work in India and will certainly help in standardizing the various parameters of the drinking water in the zoo.

College of Dairy Science and Technology

Dairy Technology: Low fat Yoghurt ice cream was developed and compared to regular ice cream, which usually contains minimum 10% milk fat. The developed product contains 80% less fat and 40% less caloriee. During pilot scale consumer study, 98% people rated the product as *'liked very much'*. The cost of developed product was comparable to the regular ice cream available in the market.

Nano-technological interventions have been developed for the application of phytosterols, a functional lipid, into food matrix as a food ingredient or as the pharmaceutical product for direct consumption for its hypochoetromic effect.

Low fat functional dahi, combining the nutrient properties of both milk and β-glucan, was developed. β-glucan, a soluble dietary fibre was explored as a carbohydrate based fat replacer for dahi and replaced 99% fat content. Developed dahi fetched better physical properties, instrumental color values, textural, rheological properties and sensory scores with attractive or natural dahi color as compared to dahi samples with lower fat content and also exhibited similar results compared to control market sample with 3% fat. Additionally, β-glucan has received considerable attention with regard to their hypoglycemic and hypo cholesterolemic capacity in humans.

Bottle gourd burfi was prepared with benefits of bottle gourd being rich in choline, dietary fiber and good source of minerals. The optimized recipe of burfi had fairly high acceptability among consumers.



Bottle Gourd Burfi



Milk chiller 40L capacity

Dairy Engineering: A phase changing material based 40L capacity milk cooler was designed, tested and technology was transferred for its commercialization and popularization.

The process for pinni making was standardidized and the unit operations required were identified. Roasting unit was designed and fabricated for a capacity of 30kg. Buffer unit mixes material that needs no heating and allows standing time for the roasting material before it moves to balls formation unit. The latter was designed and fabricated to fall balls of roasted material handsfree. Unit has capacity of making 300 balls/ hour with weight size carrying from 35-60gms. Its parts are made of food grade/stainless steel material and makes balls of uniform size and shape.



Roasting unit Model- I



Roasting unit Model- II



Pinni formation unit

Various packaging techniques like card board packaging, PET box packaging and vacuum packaging were tested for shelf life extension of traditional product pinni. Vacuum packaging method was found the best to store and market *pinni* without appreciable quality loss. *Pinni* could be stored for 40 days in vacuum packed system as compared to 14 days in cardboard boxed at refrigerated conditions. The textural and sensory attributes were found best in vacuum packed sample followed by PET boxes and board boxes.

Dairy Microbiology: Probiotic lassi was prepared by inoculating *Streptococcus thermophilus* (NCDC 217) and *Lactobacillus acidophilus* (NCDC 15) @ 2% (1:1 ratio) in heat-treated milk (3.5% fat and 8.5% SNF). Lemon grass oil was tested against 5 major food borne pathogens and Gram-positive bacteria were found more sensitive than Gram-negative bacteria.

Dairy Chemistry: Process was standardized for fortification of milk with multi-micronutrients (Ca, P and Vitamin D). For the fortification of Vitamin D in milk ergocalciferol (Lactovit) was used. Cow milk (3% fat and 8.5% SNF) was fortified with 50 mg of calcium gluconate, 50 mg of calcium phosphate dibasic and 240 IU of ergocalciferol (Vitamin D_2) per 100 ml of milk and had best sensory scores and acceptable physico-chemical properties.

Kit for detection of adulteration in milk: Kit was developed to detect adulterants like sugar, starch, urea, neutralizers and hydrogen peroxide for qualitative analysis. The cost of this kit is Rs. 300/- and stable for minimum 6 months. These kits are useful for both the farmers and consumers.



Kit for detection of milk adulteration

Dairy economics and business management: The major share in the total cost of milk production was of variable costs. The cost of milk production on per litre basis decreased with increase in herd size indicating the prevalence of economies of scale on large farms. Dairy enterprise profit per day per milch animal on per litre basis increased with increase in herd size. During the last couple of years, the cost of milk production has increased faster than increase in milk prices, thus reducing the dairy enterprise profit per litre over time. It was concluded that dairy farming was not a profitable venture on domestic and small category dairy farms and to make it profitable one, the number of cows and buffaloes per farm should be at least 8 and 5, respectively. Moreover, there is urgent need to cut down the cost of milk production on per unit basis by adopting better farm management practices so that the profitability levels can be maintained in future.

College of Fisheries

Culture of Pangas catfish for diversification: Extruded floating feed (28% CP) developed for Pangas catfish, which not only supported optimum fish growth, but also reduced the feed cost by 30%. Pangas catfish brood stock overwintered successfully under poly house condition for the 3rd year with 100% survival. Maturity in male fish (body weight 1.5 to 2.0 kg) attained after 2nd year under captivity, while female fish (body weight 2.0-2.5kg) is still to mature.





Pangas catfish Poly house



Pangas brooders developed at GADVASU

Genetically improved farm Tilapia (GIFT), Oreochromis niloticus: GIFT reared successfully in a pond cage culture system at 6 stocking densities in cages (2×2×1m) for 180 days on floating feed @ 3% of body weight two times per day in split doses, with 89-96% survival. About 32% higher biomass was produced at stocking density 70 no./m^3 as compared to stocking density 4.0 no./m^3.

Fresh water Prawn, Macrobrachium rosenberii (Scampi): Breeding and larval rearing of Scampi was carried out successfully up to post-larvae (PL) stage, for the first time in the State, by using artificial brackish water prepared at the cost of Rs. 2.16/liter. Under local climatic conditions, it took 27-34 days to complete all the larval stages. The PL were stocked in earthen pond and reared successfully, which is a significant breakthrough having ample scope of application in breeding and seed production of 'Scampi' in inland saline water available in south-west districts of the State..

New species introduced: A new strain of common carp i.e. Amur carp procured from Government Fish Hatchery, Distt. Una, H.P., acclimatized and reared for 3 months with 85% survival and satisfactory growth increment under local climatic condition. *Labeo calbasu*, procured from Central Institute of Freshwater aquaculture (CIFA), Bhubaneswar, Odhisha, reared in a periphyton based aquaculture system with over 60% higher growth rate.



Amur carp



Calbasu

Utilization of non-conventional feed resources in aquaculture nutrition: To assess efficacy of duckweed (*Lemna minor*)as a feed resource in carp feed, 4 months outdoor experiment was conducted to rear common carp, *Cyprinus carpio* fry and fingerlings with formulated feeds containing sundried *L. minor* (@10-50% incorporation level). In case of fingerlings, 20.14% higher growth was recorded in fish fed with 10% *Lemna* incorporated feed and it was observed that sundried *Lemna* can be incorporated in carp diet up to 40% level without affecting fish growth. Whereas, in case of fry, it was found that sundried *Lemna* can be incorporated in the feed up to 10% level only. The results reveal better utilization of sundried *Lemna* by the fingerlings as compared to the fry and hence can be incorporated in grow out feed up to 40% incorporation level for about 27% saving on supplementary feed cost.

Brood stock management: Feeding Strategies (feeding rate and feeding frequency) standardized for brood stock improvement in terms of weight gain, gonadosonatic index, ova diameter and fecundity in Indian major carp, *Labeo rohita* (Ham.) Brood stock feeding @ 4% body weight twice a day improved the growth and reproductive potential of fish with respect to over 25% higher net weight gain and about 60% higher relative fecundity.

Fish health management: Outdoor experiments were conducted to evaluate efficacy of two medicinal plants (*Aloe vera* and *garlic*) as growth cum immuno-stimulant in carp diet. Over 78% growth enhancement recorded in common carp (*Cyprinus carpio*L.) fingerlings, fed with garlic powder incorporated feeds (20g garlic powder/kg feed). About 50% and 88% growth enhancement recorded in common carp (*C. carpio*L.) fingerlings, fed with *Aloe vera* gel (AVG) and *A. vera* extract (AVE) incorporated feeds, respectively (10g AVG/kg feed and 20g AVE/kg feed, respectively).

In-silico study of codon usage pattern of *Penaeus mondon* nudivirus(PmNV) and its relationship with the host was performed which indicated that nucleotide composition of coding regions had a major effect on codon usage of PmNV. Codon adaptive index (CAI) values indicated that forces of selective/translational constraints have been able to overcome this antagonism in some genes. It was concluded that apart from nucleotide composition of individual genes (compositional constraints), selective constraints (gene expression/ translational selection) were also important factors influencing the codon usage pattern of PmNV.

Aeromonas hydrophila is an important fish pathogen and its infection may lead to various types of diseases such tail rot, fin rot and bacterial septicaemia. Over 50 sewage, aquaculture and fish market samples were screened for isolation of *A. hydrophila* specific lytic phages. Five bacteriophages with lytic activity against *A. hydrophila* were isolated. The lytic activity of these phages was confirmed by plaque assay and phage aliquots, in glycerol stock, have been stored in-80^{o}C.

Value addition in ornamental fish culture through colour enhancement: Rose petal meal incorporated diet developed for value addition through colour enhancement in ornamental fish, koi carp, *Cyprinus*

carpio(Linnaeus). Rose petal meal incorporation in koi carp diet @ 3% increased the carotenoid content in fish skin and muscle (3.40 µg g^{-1} wet weight basis). In addition to colour enhancement, rose petal meal at 1% incorporation level also increased fish growth by 27.15%. Carrot meal incorporated diet developed for value addition through colour enhancement in ornamental fish, koi carp, *C. carpio*(Linnaeus). Carrot meal at 5% incorporation level increased fish growth by 23.25%.

Backyard ornamental fish culture and breeding unit: A model for establishing backyard ornamental fish rearing and breeding unit (300 ft^2) for live bearer *spp.* was developed with an average income of Rs. 5,000/month, which can be adopted by rural communities at individual level or under cluster farming approach for income generation.



Backyard ornamental fish culture and breeding unit at College of Fisheries, GADVASU

Introduction and propagation of ornamental aquatic plants: Ornamental aquatic plants were procured and acclimatized successfully under local climatic conditions and are being propagated for mass culture for demonstration/training purpose.



Cryptocornea wendtii



Ludwigia repens



Echinodorus cordifolius



Elatine gratioloides



Cobomba caroliniana



Pistia spp.

Ornamental Aquatic plants introduced, acclimatized and propagated at College of Fisheries

Processing waste management: Edible proteins recovered from rohu processing waste using acid and alkaline solubilization methods with the total process recovery of 31.81% and 31.11%, respectively. Acid solubilization produced isolates with good functionality and texture. Fish mince based cutlets, enriched with fibres,developed from ragi, oat and jowar without negatively affecting their sensorial acceptability and textural attributes. From the three sources tested, fibres from oat and jowar were found suitable to incorporation in fish cutlets. Proteins recovered from freshwater fish processing waste used to develop functional fish cutlets. Incorporation of extracted proteins into cutlets improved their nutritional quality, textural quality and sensorial acceptability. Consumer behavior analysis with respect to fish consumption

and purchasing behavior revealed that the constraints with respect to fish consumption and purchase were due to lack of awareness and knowledge, lack of availability, price of available fish species and religious constraints.

Shellfish processing: Meat recovery and biochemical composition of raw/processed shrimp (*Litopenaeus vannamei*), reared in saline waters of Punjab,was analyzed. 95.51% and 69.58% average cooking yield achieved in batter coated and uncoated fried shrimp, respectively. In raw, coated and fried shrimp, average moisture content was 72.62, 47.87, 51.32%, crude protein content was 18.68, 24.89, 25.86%, crude fat content was 5.40, 19.51, 20.12% and ash content was 2.46, 2.97, 1.98%, respectively. Overall acceptability value for fried shrimp was higher than the coated shrimp.

Brackish water Shrimp (L. vannamei) farming: Biometric characteristics of pacific White Shrimp,*L. vannamei* cultured in the salt affected area of District Fazilka were observed. On the basis of Bray-Curtis similarity matrix analysis, highest similarity matrix was observed between telson and carapace weight, while least relationship was in between abdominal weight without shell and telson weight. The results reveal that there is substantial scope of rearing brackish water shrimp, *L. vannamei*, in inland saline waters of Punjab.

Data base generation : Survey work is being carried out for generating data base with respect to fish markets and marketing channels; marketing methods; fish biodiversity in natural aquatic resources (Harike wetland, river Satluj, River Beas); cost evaluation and economic assessment of fish farming in different districts of Punjab; health status of village ponds, inland saline water areas and disease surveillance.

Technological gap analysis: Survey of fish farmers (60) from different districts (08) was conducted to record farmer level technological gaps. Productivity of fish farms was found to vary from <2 to > 6t/ha/yr among small (< 2 acres), medium (2-5 acres) and large (> 5 acres) farms. Only 22.27% farmers were found to follow proper feeding management practices, out of which 55% and 45% farmers used farm made and pellet feeds, respectively. Major constraints for low productivity included stocking of undersize seed; overstocking; poor water quality and health management; irregular supplementary feeding and lack or nursery ponds.

Fish market survey: Fish market survey studies revealed that both freshwater and marine fish is being traded at fish market, Tajpur road, Ludhiana through vendors which included 88% and 12% whole sale and whole sale cum retail vendors, respectively. Out of total vendors, only 11% procured fish from Punjab, while others procured fish from Punjab as well as other States. Cosumer preference studies revealed that 66.7% consumers preferred freshwater fish and 33.3% opted for both freshwater and marine fish. Among carps, rohu was found to be the most preferred and priced species, with an average wholesale and retail price of Rs. 100/kg and Rs. 140/kg. During the week, maximum fish sale was recorded on Sundays and due to religious restrictions, sale of fish was affected on Tuesdays and during navratras.



Fish Market, Tajpur Road, Ludhiana



EXTENSION

The Directorate of Extension Education geared up extension activities through its wings like trainings, advisory service and visit to villages. In order to transfer the new technologies evolved by the university, training courses were organized for the farmers, field veterinarians and scientists from other universities. Faculty published 128 extension articles in various magazines, journals, news papers etc. in order to disseminate important information to farmers for better production. The faculty members also delivered 36 TV and 55 radio talks on the topics assigned by the Directorate of Extension Education.

Training programmes organized for farmers

Name of the training programme	Duration	No. of trainings held	No. of Beneficiaries	Collaboration
Specialized dairy farming training course	2 weeks	3	180	Different departments of GADVASU
Specialized pig farming training course	1 week	2	114	- do-
Specialized poultry farming training course	2 weeks	1	19	- do-
Specialized Goat farming training course	1 week	2	124	- do-
Balanced and Quality feed manufacturing	3 days	1	56	Punjab Dairy Development Department
Value addition of milk into value added products	1 week	1	17	College of Dairy Science & Technology
Value addition of meat into value added products	1 week	2	37	Department of Livestock Products Technology

Training programmes organized for Veterinary Officers of Animal Husbandry Department, Punjab

The University has liaison with Animal Husbandry Department, Punjab. GADVASU provides latest technical know-how to Veterinarians of the State to refresh their knowledge and enhance their professional skills.

Name of the training programme	Duration (days)	No. of trainings held	No. of Beneficiaries	Collaborative Department
Refresher training course for field veterinary officers of Punjab	5 days	4	61	Different departments of GADVASU
Hands on training for Pathology Specialists of Animal Husbandry Department of Punjab	5 days	1	16	Veterinary Pathology
Hands on training on Radiology for Surgical Specialists of Animal Husbandry Department of Punjab	5 days	1	16	Veterinary Surgery and Radiology
Hands on training for Gynaecology Specialists of Animal Husbandry Department of Punjab	5 days	1	15	Veterinary Gynaecology

Agriculture Skill Council of India

GADVASU is registered and affiliated with Agriculture Skill Council of India (ASCI) and has eight approved courses / programmes as per ASCI and has qualification packs e.g. AGR/Q4202 etc. Directorate organized one "Train the Trainer" programme of one week duration in which 30 trainees from different states were trained.

Animal Welfare Camps

The Directorate of Extension Education organized 16 animal welfare camps in the rural areas of Punjab for the treatment of sick animals. In these camps the farmers and the field functionaries were advised/made aware of the recommended animal health practices. The technical support in the form of animal welfare camps and Pashu Palan Melas has been regularly provided to Regional Research and Training Centres and KVKs.

Expert Lectures/Technical guidance

The faculty members delivered extension lectures to the farmers in collaboration with the other animal welfare agencies of the state like Dairy Development Department, Deptt. of Animal Husbandry, Punjab, Punjab & Sind Bank and in the trainings organized by the Krishi Vigyan Kendras and Department of Extension Education, PAU, Ludhiana. On these occasions, demonstrations regarding the collection, dispatch and transport of clinical material like blood, mucous discharge and faeces from the animals, correct method of milking, teat dip, computation of ration, silage making, acaricide drug application and heat detection were carried out in the field for livestock farmers.

Farmers Associations

Various farmers associations are working under the aegis of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. The Directorate of Extension Education is involved in regulating the activities of different livestock farmer associations. The regular monthly meetings/seminars of members of these associations are being held at GADVASU, Ludhiana. Besides giving lectures on technical information, the queries/ problems of farmers are solved by university experts. These meetings provide a common platform for both scientists and farmers to solve problems at field level expressed by the farmers. It is also a good platform for sharing information with fellow farmers as a means of Horizontal learning process.

Farmers Advisory Helpline

The telephonic helpline in the Department of Veterinary and Animal Husbandry Extension Education attends to the queries of livestock owners regarding the animal health and management problems. Telephone helpline was stared with the motto "You ask, We reply". The University has also been receiving calls from distant areas like Haryana, U.P., Bihar, Rajasthan, H.P., M.P., Maharashtra, Jharkhand, Gujarat, A.P., Karnatka and Telangana . The farmer queries were attended on helpline for on the spot solution and the queries are also answered through postal letters as well as through E-mail.

Farmers Information Centre

The Farmers Information Centre run by the university act as a single window system to cater the needs of the farmers at one place. The farmers have been given technical advice during their visit to the University. The various university publications/extension literatures are available in the farmer information centre for the use and purchase by the farmers and they can also register for various training programmes. The faculty of the department attends to the farmers' queries on various subject matters in this centre.

Pashu Palan Melas

The faculty actively participated in organizing the Pashu Palan Mela of the Guru Angad Dev Veterinary & Animal Sciences University held in the months of March and September every year. In these melas the departments of constituent Colleges of the University arranged exhibition stalls to show the new technologies/ innovations developed for the farmers. On this occasion the other government and private agencies involved in animal welfare work also displayed their exhibits much of the importance to the farmer community. A large number of farmers visit the melas and discuss their problems with the experts of the university. The mela highlights the services and facilities available at university and other informational materials were distributed to the farmers. The university also participated as knowledge partner in the Kisan Melas at Ballowal Saunkhari, Gurdaspur, Bathinda, Rauni, Tarntarn/Amritsar, Faridkot Regional Research Stations/ KVKs of PAU for the benefit of the Livestock farmers.



Glimpses of Pashu Palan Melas

Chief Minister Award

To give a push to the livestock farming, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana conferred Chief Minister Award to progressive farmers of the state. Many livestock farmers applied for the CM award in different categories and the University team visited the Livestock farms of the farmers. The Chief Minister's Awards for 2016 were given to Sh. Iqbal Singh S/O S. Gurbaksh Singh VPO Gholian Kalan, Moga for Cattle farming, Sh. Malkit Singh S/O S. Harvinder Singh VPO Farwahi, Distt. Barnala and Sh. Balwinder Singh S/O S. Charan Singh VPO Uchi Rurki, Distt. Fatehgarh Sahib jointly for Buffalo farming, Sh. Jasvir Singh S/O S.Jodh Singh, Vill.Karondian, Distt. Ludhiana for Fish farming and Sh. Dharminder Singh S/O S. Nirmal Singh, Vill. Sangera, Distt. Barnala for Piggery. Dr. A S Nanda, Vice-Chancellor, GADVASU, Ludhiana bestowed the C.M. award to the farmers and farmers were presented with a citation, Cash award and lohi.



GADVASU confers Chief Minister Award to Livestock Farmers of the State

Linkage with other departments

The University has liaison with line departments of Punjab State viz; Animal Husbandry, Dairy Development and Fisheries for undertaking various animal welfare activities. The University participates as knowledge partner in various livestock promoting activities viz. Livestock Shows, livestock championship, dairy training programmes, Animal welfare camps/field days etc. organized by the State departments every year and the exhibitions were arranged at various places of events.

Directorate of Extension Education,GADVASU provided the technical assistance in establishing the modern dairy farm at Gurudwara Karmsar, Rara Sahib and now a farmer field school is operational at Rara Sahib.

Guided Visits/ Farmers Exposure Visits

To provide the latest technical know-how existing at farms of progressive farmers, the trainees are taken to these model farms to get exposure about the practices being followed so that they can practically judge the pros and cons of the practices for adoption at their farm and the trainees of different associations like ATMA, Punjab Dairy Development Board, National Dairy Development Board have been provided with facilities to visit the farms.

National livestock championship -2016

University participated in Progressive Punjab Agriculture Summit organized by the Punjab Government in association with PHD Chamber of Commerce & Industry from Jan 8-12, 2016 at Sri Muktsar Sahib, Punjab. Thousands farmers from Punjab, Madhya Pradesh, Rajasthan, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttar Pradesh, Uttarakhand etc participated in this mega event. The University established an exhibition stall at this expo and displayed the latest innovative technologies developed at GADVASU. The University participated as knowledge partner and facilitated various livestock development sessions viz. Commercial dairy farming, Rearing of small ruminants, Fisheries, The University faculty from various departments participated in technical Summit-2016 held parallely and educated the farmers about various aspects of livestock farming.

Utility services: The University is providing the following utility services at a very nominal rates for the livestock farmers:

I. Information Services- For up gradation of knowledge of the farmers, extension functionaries, scientists and subject matter specialist, the Directorate of Extension Education has been bringing out following publications.

a. Publications (Books)
- Package of Practices for Veterinary and Animal Husbandry(English & Punjabi)
- Vigyanak Pashu Palan (Monthly Punjabi Magazine)
- Hand book on Infectious Animal Diseases
- Veterinary Shabad Kosh
- Dairy Farming
- Goat Farming in Punjab (English & Punjabi)
- Pashuan Da Parjanan Parbandh
- Santulit Ate Miyari Pashu Khurak
- GADVASU hand-book(Punjabi and English)
- Poultry Farming
- Indigenous practices of farmers
- Reproductive management of dairy animals (Punjabi and Hindi)
- Vigyanak Soor Palan
- Paltuu Kutian Di Sambh Sambhal
- Colour Atlas and Diagnostic Guide of Farm Animal Diseases
- Laveriaun which dudh utpadan
- Reproduction calender

b. Video flims
- Repeat Breeding in Dairy Animals
- Anoestrus in Buffaloes

c. T V/Radio talk

d. Telephone helpline: 0161-2414005, 2414026

II. Technical services :

a. O.P.D./Indoor services for sick animals.
b. Surgical treatment of animals
c. Blood/faeces/urine/mucous/milk testing
d. Feed and fodder evaluation
e. Testing of water sample
f. Post mortem of animals



III. Input services:

a. Mineral mixture, Area specific mineral mixture and Mineral mixture for Pigs
b. Uromin lick
c. Semen
d. Bye pass fat
e. Breeding bulls/calves
f. Mastitis kit
g. Disease outbreaks
h. Sale of carp fish seed and ornamental fish seed/table size fish
i. Maintenance of Aquaria

IV. Chartered services:

a. Animal Welfare Camps/days
b. Expert lectures (on campus/field)
c. Training programmes for farmers, field functionaries (on campus/field)
d. Tailor made courses (on campus/field)

Krishi Vigyan Kendra, Booh (Tarn Taran)

Training Programmes

A number of trainings (short duration and vocational) have been organized by KVK, both on and off campus modes. Trainings have been organized in the disciplines of Animal Science, Crop Science, Soil Science and Home Science. The details of trainings conducted are as follows:

a. Vocational Trainings (3-5 days programme)

Villages	Name of course	No of trainings	Block	Month	No. of beneficiaries
Vocational trainings (5 days)					
Sito Mahi Jhugian	Goat Farming	01	Patti	September 2014	40
Harike Pattan	Home Science	01	Patti	September 2014	20
Mari Kamboke	Dairy Farming	01	Bhikhiwind	October 2014	53
Mari Kamboke	Dairy Farming	01	Bhikhiwind	Oct-Nov. 2014	66
Dhunda (Goindwal)	Pig Farming	01	Chola Sahib		42
Nathuchak	Integrated Goat and Fish Farming	01	Naushera Pannua	January 2015	40
Madar Mathra Bhagi	Integrated Dairy-Vermi composting-Kitchen gardening training course	01	Bhikhiwind	February 2015	40
Booh Havelian	Home Science	01	Patti	February 2015	20
Vocational trainings (3 days)					
Dhunda, Goindwal	Rabi crops (Crop and Soil Sciences)	01	Chola Sahib		29
Short duration trainings (1 day)					
Booh Havelian	Home Science	03			
Booh Havelian	Crop, Soil, Animal and Home Science	03	Patti		85
Jindawala	Crop Science	01	Patti		13
Thatian Khurd	Crop and Animal Science	01	Patti		12
KVK campus	Animal, Crop and Soil Science	03	KVK Campus		79
Mari Kamboke	Crop, Soil, Animal and Home Science	04	Bikhiwind		99
Sito Mahi Jhugian	Crop, Soil, Animal and Home Science	03	Patti		78
Dhunda	Crop and Soil Science	02	Chola Sahib		37
Kirtowal	Crop and Soil Science	01	Patti		11
Chamba Khurd	Crop Science	01	Naushera Pannua		21
Booh	Integrated crop and animal science	01	Patti		13
Others	Miscellaneous	04			48
Total		36			846

b. One day training programmes details

Name of the Training Programme	Duration (days)	No. of Trainings held	No. of Participants
Demonstration on soil and water sampling for testing	1	1	19
Vaccination and deworming of farm animals	1	1	18
Enhancing Kharif Fodder crops productivity using agronomic approaches	1	1	25

Name of the Training Programme	Duration (days)	No. of Trainings held	No. of Participants
Fertilizer and water management in fodder crops and feed formulations for dairy animals	1	1	15
Nutrient and water management in kharif season crops	1	1	20
Strategies for increasing basmati rice production, fertilizer and water management in fodder crops. Use of leaf colour charts in paddy for nitrogen management	1	1	15
DSR : an economical agronomic practice for paddy	1	1	39
Demonstration of soil sampling at farmers' field	1	1	11
One day training programme on package and practices of DSR	1	1	17
Scientific rearing of calf	1	1	19
Seed treatment for control of footrot in basmati rice and method demonstration of soil sampling	1	1	11
Basmati: An effective alternative to paddy crop and Techniques for efficient weed management in kharif crops	1	1	15
Animal welfare cum treatment camp and Farmer awareness camp	1	1	75
Demonstration on soil and water sampling	1	1	12
Use of leaf colour chart in paddy for Nitrogen management	1	1	15
Role of minerals in feeding of dairy animals and silage & hay making	1	1	20
Interpretation of soil and water test reports	1	2	23
Pre-partum and post-partum care of dairy animals	1	1	22
Promotion of Kharif of pulses as pure or inter crop practice	1	1	21
Storage and management of FYM	1	1	17
Concept of clean milk production	1	1	19
Production technologies for ensuring year round green fodder availability	1	1	17
Management of Paddy straw	1	1	23
Feed formulation for dairy animals	1	1	22
Technique to collect a representative Soil Sample	1	2	107
Integrated nutrient management in gram	1	2	35
Package of practices for rabi season crops cultivation	1	1	68
Use of mineral mixture in dairy animals	1	2	25
Weed management in rabi season crops & spraying techniques of herbicides	1	2	18
Correction of Mn deficiency in wheat & Use of Leaf colour chart for N management	1	2	19
Soil health management through combined use of organic (FYM) and inorganic sources of nutrients (International Soil Day)	1	1	126
Goat Farming cum organic fodder production	5	1	40
Use of mineral mixture in dairy animals	1	1	17
Weed management in wheat	1	1	16
Pregnancy in women	1	1	13
Goat farming training course	5	1	40

Front Line Demonstrations

A total of 12 FLDs on Gobhi Sarson, Gram, Kitchen gardening, MP Chari, Tensiometer, Direct seeded rice, Fodder maize, new paddy variety (PR 123), wheat varieties, mineral mixture, and others have been conducted involving around 300 farmers at various locations in the district.

Operational villages

In a cluster approach, activities of KVK in five villages have been initiated. In cluster 1: Village Booh; in cluster 2: Village Jindawala and a new cluster of villages Mari Kamboke, Sito Mahi Jughian and Dhunda have been taken up as operational villages for KVK activities. KVK activities of animal welfare camps, soil and water testing services, agricultural camps, vocational trainings, FLDs, OFTs and others have been initiated in these villages. Operational villages are regularly being visited by KVK Scientific staff rendering facilities on various aspects of agriculture and allied fields along with backstopping from GADVASU and PAU Ludhiana and other NARS Institutes.

Technical Guidance/Transfer

Programme	Date(s)	Place	Number of Participants
Farmers' awareness programme against residue burning	09, 16, 24, 30.04.2015	Dader Sahib Dhunda village KVK, Booh Kirtowal	79
Kisan Sammelan (provided guidance on resource conserbation, cultivation practices of kharif crops, Soil testing, Animal nutrition, etc.	16.07.2015	Harike Pattan (Sama Resort)	473
Awareness Camp on Parthenium: Adverse impact and control	18, 19 & 20.08.2015	KVK Campus, Dhunda & Dader Sahib	37
Farmer's awareness programme against residue burning	26.10.2015	Dader Sahib	14
Soil sample collection technique	01.11.2015 to 10.11.2015	Different blocks of Tarn Taran	250
Mass awareness campaigning against residue burning	3.11.2015	Dhunda	11
Seed distribution camp	05.11.2015	KVK	60
Soil health management tips on the occasion of International Soil Day 2015	05.12.2015	KVK Campus, Tarn Taran	126
Guidance on balanced Animal plant nutrition in Animal welfare & treatment camp	21.12.2015	Kalwan, Naushehra Pannua	129
Technical guidance on value addition, control of weeds in rabi crops, N management in wheat on the occasion of 'Jai Kisan Jai Vigyan' Divas	23.12.2015	Mundapind, Chola Sahib (Village adopted under SAGY)	135

Miscelaneous Extension Activities

- A technology park is being established at KVK campus based on demonstration plots on various technologies viz. kitchen gardening with seasonal vegetables, different varieties of wheat, vermicomposting, different rice varieties, agroforestry components, and others.
- KVK Scientists have been delivering lectures in their respective fields at block level farmers' fairs conducted by Department of Agriculture, Punjab.
- Soil and water testing services have been provided to about 85 farmers. The samples were got tested from Soil Science laboratory, PAU, Ludhiana. The lab facilities for testing soil and water are not presently available with KVK. A demo plot of wheat has been sown in 3 acre area of KVK farm. Demonstrations

on soil sampling, herbicide application, and preparation of pickles, chutneys, Jams, and dairy cattle management practices are being organized in operational and other villages of the district, for farmers.

- In agro-forestry, Eucalyptus tree saplings have been distributed to around hundred farmers having land belonging to waterlogged areas and near to river beds.
- Relevant extension literature has been distributed to various farmers during trainings.
- KVK has convergence with other allied agencies like NIFTD for a project on Fodder Production Modules; with RKVY for trainings to Schedule cast category of the farmers in the district; with ATMA for development of farm technology at the frontline.
- KVK scientists have published seven popular articles in various scientific magazines and journals like Vigyanik Pashu Palan, Kheti Dunia, and others.
- On an average, 25-30 farmers visit KVK every month. Regular visits are made by KVK Scientists to the farmers' fields to provide diagnostic services on various aspects of Crop, Soil, Animal and Home science.

Krishi Vigyan Kendra, SAS Nagar (Mohali)

Training Programmes

Name of the Training Programme	Duration (days)	No. of Trainings held	No. of Participants
Orchard Management practices	01	01	15
Crops diversification through horticultural crops	01	01	20
Cultivation of exotic vegetables	01	01	16
Training and pruning of mango	01	01	20
Udder health and clean milk production	01	01	16
Care and management of periparturent dairy cows and buffalows	01	01	14
Cultivation practices of Kinnow	01	01	17
Gardeners Training	05	01	20
Dairy care and management	01	01	36
Dairy farming	05	01	50
Nursery raising and management in vegetable crops	01	01	18
Fish Farming	01	01	11
Dairy farming basics	01	01	14
Pig farming	01	01	17
Basics of Fish Farming	01	01	29
Protected Cultivation	01	01	17
Plant Protection Measures for seasonal vegetable crops	01	01	15
Management of Dairy Animal during winter	01	01	17
Prospects of fish farming in Mohali district	01	01	12
Net home cultivation of vegetables	01	01	16
Insect pest and diseases management in wheat	01	01	17
Control of insect pests and diseases of Rabi fodder crops	01	01	17
Protected Cultivation	One week	01	20
Value addition of vegetable crops	01	01	23
Scientific approach to dairy farming	05	01	25

Name of the Training Programme	Duration (days)	No. of Trainings held	No. of Participants
Poultry Farming	01	01	26
Grading and Packaging of mango and guava	01	01	16
Nutritional implications in dairy animals	01	01	15
Fish Farming for Employment Generation	01	01	08
Preservation of seasonal fruits and vegetables	01	01	16
Control of insect pests and diseases of potatoes	01	01	21

In addition to the above said trainings the KVK has conducted following extension programmes in Mohali;

Frontline demonstrations: various FLDs have been conducted on Sarson (10 acres), Moong (74 acres), Chick pea (64 beneficiaries), Kitchen Gardening (10 acres) and raddish (2acres)

Technology assessment in:

a. Effect of Zinc Sulphate application on onion bulb yield (10 trials with 10 farmers)

b. Management of yellow rust in wheat (10 trials with 10 farmers)

Krishi Vigyan Kendra, Handiaya (Barnala)

Vocational Trainings

Krishi Vigyan Kendra Barnala has organised a total 07 trainings on various agriculture, animal husbandry based enterprises to create self-employment and benefiting 224 rural youth. The details are as under:

Name of the Training	Duration (days)	No. of Trainings held	No. of Participants
Bee-Keeping	05	01	30
Scientific Dairy Farming	15	01	39
Bee-Keeping	05	01	31
Organic Farming	05	01	38
Poultry Farming for self employment	05	01	29
Bee-Keeping	05	01	33
Ornamental fish culture and aquarium fabrication for self employment	05	01	24

Training Programmes

In addition to skill based long duration trainings KVK, Barnala has conducted 28 one day training programmes and benefiting 548 farmers and farm women to enhance the productivity and profitability of agriculture, animal husbandry and related fields in the district.

Name of the Training Programme	Duration (days)	No. of Trainings held	No. of Participants
Importance of feeding of bypass fat in crossbred cows	01	01	14
Piggery farming management	01	01	31
Management of insect-pest of store grains	01	01	20
Scientific feeding and management practices in dairy animals	01	01	26
Intensive forge production system	01	01	15
Seed treatment of Kharif Crop	01	01	17

Name of the Training Programme	Duration (days)	No. of Trainings held	No. of Participants
Weed, Water and Nutrient Management in Rice/LCC for N Management	01	01	20
Management of Insect Pest of Kharif fodder crops	01	01	17
Judicious use of pesticide in paddy crop	01	01	21
Productive & Reproductive management in dairy animals	01	01	18
Weed and nutrient management in Kharif fodder	01	01	15
Fish Farming for Livehood Improvement	01	01	25
Integrated Pest Management in Cotton Crop	01	01	19
Importance of Soil & Water Testing	01	01	21
Integrated Fish Farming	01	01	11
Management of insect-pest and diseases of rabi folder crops	01	01	17
Diversification of livestock farming	01	01	20
Diseases of potato crop and their management	01	01	19
Integrated pest management of oil seed crops	01	01	17
Feed management in crop fish culture	01	01	11
Care & management of dairy animals in winter season	01	01	15
Weed and nutrient management in wheat	01	01	15
Importance of deworming & vaccination in dairy animals	01	01	23
Tie & Die for self employment	01	01	21
Care & management of growing layer birds in winter season	01	01	22
Fish farming for self employment	01	01	22
Surf-washing detergent making for rural women	01	01	36
Safe use of pesticide (Herbicides)	01	01	20

SPECIAL PROGRAMMES FOR SCHEDULE CASTE FAMILIES:

Krishi Vigyan Kendra, Handiaya (Barnala) has organized special programmes for schedule caste families of the district for their upliftment and improving family income through animal husbandry activities.

Trainings

KVK has conducted 2 trainings on goat farming and 2 training on backyard poultry farming specially for schedule caste and benefiting 99 farmers and farm women.

Vaccination against Enterotoxaemia

Vaccination against enterotoxaemia and other diseases in goats is not followed by farmers. Keeping this KVK has vaccinated more than 1000 goats of trained farmers in different villages of Barnala district.

Promotion of back yard poultry farming

After providing training on back yard poultry farming to the schedule caste farmers , KVK Handiaya has supply a total 1050 chicks of day old of RIR breed to 35 schedule caste farmers (30 chicks to each) for establishment of backyard poultry and to get additional income from sale of eggs in future.

Supply of Beetal buck for breeding purpose

Beetal breed of goat is proud of Punjab in goat world. Hence to promote and to maintained genetic purity KVK Handiaya planned to supply 5 beetal buck for breed improvement to trained schedule caste farmers.

Supply of Beetal goats

Goat is considered as poor man's cow. KVK has planned to provide 20 beetal goats to 20 poor schedule caste farmers to enhance their income and to sustain their livelihood. Farmers may increase the number of goats by coming generations of provided goats.

Animal Welfare Camps

Two vaccination camps against ETV& PPR were organized by KVK, Barnala during the reporting period and vaccinated 140 goats. One Animal health camp was also conducted and 813 animals were benefited of 43 farmers.

Frontline Demonstration (FLD)

Sr. No.	Title of FLD	Area/Animals	No. of farmer
01.	Direct seeded rice (DSR)	9 acre	03
02.	Management of foot rot in basmati rice	10 Acre	10
03.	Judicious use of water in paddy crop through use of Tensiometer	-	05
04.	Use of leaf colour chart in paddy crop for optimum utilization of nitrogen	-	12
05.	Introduction of high yielding variety of mustard (oil seed)	10.5 Acre	21
06.	Introduction of high yielding variety of gram	20 Acre	40
07.	Promotion of kitchen gardening	-	20
08.	Feeding area specific mineral mixture	40 Animals	40

On farm testing (OFT)

Sr. No.	Title of OFT	Area/Animals	No. of farmer
01.	Bio-rational management of stem borer	14 Acre	14
02.	Response of MnSO4 foliar application in wheat crop	10 Acre	10
03.	Impact of herbicides in rabi onion for weed management	10 Acre	10
04.	Rational deworming	15 Animals	11

Kisan Sammelan

To extend the latest technology at larger level KVK, Barnala has organized three Kisan Sammelan/Farmers' Scientist Interaction and benefiting 671 farmers' and farm women.

Other activities:

- KVK, Barnala has registered 1139 farmers for mobile short messages service and is sending text message to the farmers about Agriculture, Animal Husbandry, Horticulture and Plant Protection through Kisan portal service through ICAR. The KVK has sent 39 messages to 27,153 farmers of Barnala district. KVK, Barnala is providing solution of the problems of the farmers on telephone 379 phone call has received during reporting period.
- KVK, Barnala has conducted 3 (three) awareness campaign against burning of residue of wheat, paddy and motivated to farmers to use these residues as manure and benefiting 103 farmers. Organized one campaign on Savachhta Bharat Abhiyan participating 70 farmers and farm women.
- Krishi Vigyan Kendra, Handiaya district Barnala has organized a International Soil Day on 5th December 2015 and distributed soil health day card to 258 farmers. KVK has collected 258 soil samples from different villages of Barnala district for purpose of soil health card.

LIBRARY AND NETWORKING



The GADVASU library is central to the academic and research activities of the university. The various operations and services of library are fully automated using LSEase Library Management System. The Library remains open from 9:00 a.m. to 7:00 p.m. on all working days and from 9:00 a.m. to 5:00 p.m. on Saturday, Sunday and holidays throughout the year with closings only on 5 national holidays, i. e. 26th January, 15th August and 2nd October, Holi and Diwali. The library staff works in two shifts i.e. from 9:00 a.m. to 5:00 p.m. and from 11:00 a.m. to 7:00 p.m. to facilitate library services for extended hours. The library provides single window access to its various e-resources, services and other important information through its' website i.e. Cyberary (http://www.gadvasu.in/). The website of library is continuously updated to facilitate current information to users. The library is member of Consortium for e-Resources in Agriculture (CERA) providing access to about 3500 journals in the broad spectrum of Agricultural Sciences including Veterinary Sciences, Animal Husbandry, Livestock Management & Poultry Sciences, Fisheries and Aquaculture, Dairy Technology, Biotechnology, Animal Nutrition and allied subjects. The Web OPAC (Online Public Access Catalogue) of the library is also accessible through website of the library. In addition, the website provides access to various forms/ proformas relevant to the fraternity of GADVASU. Web-links have been given to various open access electronic information resources to access the scientific literature. To keep the users informed of the incoming documents, list of latest arrivals is regularly updated on Cyberary website. The other information technology based services of library includes automated circulation, creation of ID Cards, database management for the books, journals, thesis etc.

During the year 2015 the university library subscribed to 8 foreign journals, 3 Indian journals and a statistical database i. e. Indiastat.com. Library has strengthened its e-books collection for the academic community of GADVASU and a link has been given to e-books on the website of library. The need based print books were also added to the book collection of library. The library has taken initiative to develop audios and videos of clinical and other practices related to veterinary science and animal husbandry. These audios and videos are expected to be useful to veterinarian (including faculty, practitioners, students and researchers) and farmers in uplifting the animal husbandry and livestock farming in the state.

In addition to the routine functioning library is providing data inputs to the National Information System on Agricultural Education Network in India (NISAGENET), a portal being maintained at the Central Server of IASRI, New Delhi to provide Country/State/University/College level reporting on agricultural education in India. The library is also ensuring data inputs to the All India Survey on Higher Education (AISHE) portal initiated by the Ministry of Human Resource Development (MHRD) to build a robust database and to assess the correct picture of higher Education in the country. The library is also entrusted with the job of ensuring

compliance to the e-Waste Management & Handling Rules 2011 by the university. Under these rules it is mandatory on part of university to ensure that e-waste generated by them is channelized to authorized collection centre or registered dismantler or recycler.

Networking

The university library has established campus wide network in GADVASU connecting more than 500 nodes throughout the campus. The Library provides various services like Internet, e-mail, and access of library through Intranet website in GADVASU Campus through Campus Wide Area Network. The library provides Network Server Management under which the internet services are providing through the Campus Wide Area Network on Fiber Optic Cable. The internet services are provided throughout the Campus through User base authentication. The library hosts Intranet Web Server to provide Library Services throughout the campus from cyberary website. The centralized controlled antivirus has been installed on desktop computers in library premises.

The library also hosts CD Server to provide access to electronic format of books to the faculty and students of university. The library provides the email services to the staff on domain @gadvasu.in. This email service can be accessed worldwide. The information technology personnel of library manage and control the server for Apache Web-server, Mail Services, Network Management System, CD Server and Server for Antivirus Software. The library monitors the traffic and security of Local Area Network through the monitoring software like CISCO LAN Assistant, Cisco Adaptive Security Device Manager 6.1 etc. In addition, library maintains, troubleshoots and administers the use of Local Area Network (LANs) which has more than 500 nodes to access the services of intranet and internet. The facility for managing network switches for continuous smooth functioning of internet services is also rendered by library.

The networking facility of GADVASU has also been extended to cover hostels using Wi-Fi technology. The Wi-Fi network is centrally controlled by using the control based technology from centralized location. The controller equipments are placed in the library server room. The other areas of the campus will be later connected through the same controller device. The university library spent Rs. 43.59 lacs for covering the Wi- Fi network in all boys hostels.



Reading hall and computer room of the Library

SPORTS AND CO-CURRICULAR ACTIVITIES



Sports Wing

During the period under report, university has created enough facilities to promote the sports activities among the students. Large number of students (both boys and girls) from constituent colleges has shown keen interest in sports activities. 10th Annual Athletic meet of the university was held on March 15-16, 2016. Sports Contingent of 40 athletes participated in 16th All India Inter Agricultural Universities Sports & Games Meet held at Tamilnadu Agricultural University, Coimbatore from Feb. 22-26, 2016. During the year under report, our students participated in various North Zone Inter-varsity Tournaments as given below:

Sr. No.	Events /Games	Organizing University	Date of Competition
1.	Badminton (M&W)	Maharishi Dayanand University, Rohtak (Haryana)	29.09.2015 to 04.10.2015
2.	Volleyball (M)	Guru Gobind Singh Indraprastha. University, New Delhi	15.10.2015 to 20.10.2015
3.	Basketball (W)	Jamia Hamdard, New Delhi	02.11.2015 to 09.11.2015
4.	Cricket (M)	Aligarh Muslim University, Aligarh (UP)	19.11.2015 to 07.12.2015
5.	Table Tennis (M)	University of Delhi	16.12.2015 to 18.12.2015
6.	Handball (M&W)	Chaudhary Ranbir Singh University. Jind (Haryana)	31.12.2015 to 05.01.2016
7.	Fencing (M&W)	Punjab University, Chandigarh	11.02.2016 to 14.02.2016

The students of the university won several positions in sports as below:

- GADVASU students won 2 gold & 1 silver medal in Athletics (M) 1 gold medal Table Tennis (M) and 1 silver medal in Basketball (M) in 16th All India Inter Agricultural Sports and Games meet from 22-26 Feb 2016 to be held at Tamil Nadu Agricultural University, Coimbatore for the session 2015-16.
- Mukhmeet Singh (L-2011-V-48-B) and Sonikbir Singh (L-2010-V-67-B) got 2nd Position in 44th Senior National Handball Championship held at Ujjain (M P) from11-10-2015 to 16-10-2015.
- Harpinder Singh (L-2K14-F-10-B) got 1st Position and Jobanpreet Singh (L-2K11-F-11-B) got 3rd Position in Senior State Power Lifting Championship held at Patiala (PB) 2015-16.
- Harpinder Singh (L-2K14-F-10-B) got 1st Position in District Ludhiana Power Lifting Championship held at Samrala (PB) 2015-16
- Prabal Gautam (L-2K13-V-60-B), Harmanjeet Singh (L-2K12-V-29-B) and Sonikbir Singh (L-2010-V-67-B) and got Fist Position in Saheede Azam Bhagat Singh State Games 2015-16 held at Ludhiana.



Glimpses of 10th Annual Athletic Meet

Cultural Activities Wing

Cultural Activities Wing of the Directorate has been entrusted with the responsibility of promoting the cultural and co-curricular activities among the students, sharpening of their skills in the fields of fine arts, theatre, drama etc. and to provide them a platform to articulate their creativity. To achieve this objective, the wing organizes regular camps, seminars, meetings and interaction with eminent artists/personalities from the field of art and culture and facilitates the participation of the students in cultural programmes in and out of the University. During the period under report:

- 6th Youth Festival of GADVASU was organized from 31st October to 6th November, 2015.
- In December, 2015 Inter University North Zone, Youth Festival was conducted from 14 to 18 January, 2016 in PAU, Ludhiana. The students of GADVASU won 1st position out of 30-31 universities for cultural procession, 3rd position in theatre skits and 3rd position in photography.

- The students participated in 16th All India Agricultural Universities Youth Festival held at OUAT, Bhubaneswar, Orissa from February 1-4, 2016 and won second prize in Group Folk Dance (boys).
- The Cultural Activities Wing of the University also organized functions to celebrate Independence Day (15 Aug., 2015), Republic Day (26 Jan., 2016). Students showed their talents by presenting patriotic song and skits during the celebrations.



6th Inter College Youth Festival



Republic Day Celebration

NSS Unit

The NSS Unit of the university organized 7 days NSS Special Camp with the theme 'Role of Youth in Control of Drug Abuse' from November 20-26, 2015 at Khalsa College of Veterinary and Animal Sciences, Amritsar in which a total of 74 students of College of Veterinary Science participated. Another 7 days NSS Special Winter Camp with the theme 'Swasth aur Swatchh Bharat' was organized from January 21-27, 2016 at GADVASU campus with as many as 85 NSS volunteers from College of Fisheries and College of Dairy Science participating in the special camp. During the Seven days camp, the NSS volunteers were exposed to a blend of variety of activities including beautification of campus, yoga and aerobics sessions and lectures on varied subjects related to social welfare, cleanliness and healthy living.

Ramandeep Kaur, a 3rd year student of College of Dairy Science represented Punjab team as NSS volunteer at the 20th National Youth Festival 2016 held from January 12-16, 2016 at Raipur in Chhatisgarh. She also attended the National Youth Convention during the camp.

A cleanliness drive was conducted at College of Fisheries on November 19, 2015 with the theme 'Clean and Beautiful Campus'. Going with the theme , the NSS volunteers cleaned the classrooms, laboratories during this programme.

A plantation programme was conducted at College of Fisheries on December 3, 2015 with the theme 'Clean and Beautiful Campus' and had UG students planted trees near the Fisheries College and farm area in campus.



Seven Day NSS Special Winter Camp

NSS Special Winter Camp 2016 was organized from January 21-27, 2016 with the theme 'Swasth aur swatchh bharat'. Meeting social obligations, a six Kilometers long march for eye donation camp was held from Aarti Chowk to MBD Neopolis in collaboration with Shankara Eye Hospital. Another March of Penance for Clean environment against the dumping of solid waste in rivers, sand mining and conservation of Flora and Fauna was organized. During the year, awareness campaigns on Drug Addiction and Female Foeticide were organized from time to time.

Generating overwhelming response from among the students, faculty and participating institutions, the NSS Unit also observed various important days such as National Youth Day, Wetland Day, World Health Day, Anti-Terrorism Day, World No Tobacco Day, World Red Cross Day, World Environment Day, World Population Day, Sadbhawana Divas, Teachers Day, International Literacy Day, International Peace Day, NSS Day, Social Justice Day, National Blood Donation Day, Communal Harmony Day, National Integration Day, World AIDS Day, World Human Rights Day, Road Safety Week, Van Mahotsav Week, International Literacy Week, *Parthenium* Awareness Week and Qaumi Ekta Week. The volunteers also provided their services in creating awareness on various social welfare issues in rural areas as well as in urban slum areas and contributed in evolving solutions to environmental issues and other social evils.

ESTATE ORGANIZATION


New Girls Hostel

During the period under report, the Estate Unit continued to look after its lands, buildings and maintenance services. The construction wing continued its efforts for the construction of new buildings and renovation of existing ones. On the front of Students' Welfare activities, efforts have been made to provide maximum facilities and amenities in the hostels so that the students could feel at home. Efforts have also been made to provide security, good landscaping, proper cleanliness and good atmosphere in the campus.

Construction Wing:

1. The Vice-Chancellor's new residence has been completed.
2. The building of KVK Handiaya was inaugurated on Jan. 22, 2016.
3. The work of new Girls' hostel is likely to be completed soon and from next session onwards the girls would be allotted accommodation in the new Girls' hostel.
4. The construction work of other buildings such as College of Dairy Science and Technology, School of Animal Biotechnology & School of Public Health and Zoonosis, College of Fisheries and Veterinary Referral Hospital is progressing and would be completed soon.
5. The estate organization has under taken various renovation works in different departments of the university to facelift the infrastructure.
6. New street lights have been installed in the administrative block side.
7. The main gate of the GADVASU would be fully functional in the coming days.

Security Wing

To give a sense of security to faculty, staff and students, the security wing of the directorate continued to provide round the clock security in the Campus and manned at its entry gates.

Landscape Section

Landscaping wing of GADVASU is looking after planning and implementation of custom landscape plans and maintenance of existing/developed landscape area. New lawns were prepared by using scrapings of grass from existing lawns instead of purchasing grass from local nurseries. Plantation work, pruning of trees, cleaning by cultivation and leveling was carried out in various buildings of the university. Approximately 300 plants were planted in the university campus. Landscaping plan of the new buildings has been prepared as per suggestions of landscaping/horticulture expert and landscaping work is in progress.

Conferences and Trainings Organized

1	Training Programme on Control of Infectious Animal Diseases organized by Deptt. of Veterinary Medicine from March 9-13, 2015.
2	Training Programme on Control of Infectious Animal Diseases organized by Deptt. of Veterinary Medicine from March 16-20, 2015.
3	Epidemiologic study design and data analysis organized by School of Public Health and Zoonoses in collaboration with University of Sydney, Australia from April 13-15, 2015.
4	Dairy Welfare Association Meeting organized by Veterinary and Animal Husbandry Extension Education, GADVASU, Ludhiana on May 19, 2015.
5	Goat Farming Training organized by Veterinary Polytechnic & RRTC, Kaljharani from June 8-12, 2015.
6	Hands on training on Radiology for Surgical Specialists of Animal Husbandry Department of Punjab organized by Veterinary Surgery and Radiology on June 12, 2015.
7	Animal Husbandry officer's workshop organized by Veterinary and Animal Husbandry Extension Education, GADVASU, Ludhiana in collaboration with State Department of Animal Husbandry from June 26-27, 2015.
8	Hands on training for Gynaecology Specialists of Animal Husbandry Department of Punjab organized by Department of Veterinary Gynaecology and Obstetrics on July 17, 2015.
9	Refresher training course for Veterinary Officers of State Animal Husbandry Department organized by Department of Veterinary Medicine from July 20-24, 2015.
10	5 days training program on Breeding techniques of Indian major Carps for officials of State Fisheries Department, Himachal Pradesh (H.P.) organized by College of Fisheries from July 20-24, 2015.
11	3 days training program on Ornamental Fish Culture, Breeding and Aquarium Fabrication organized by College of Fisheries from August 5-7, 2015.
12	5 days training program on Fish Farming organized by College of Fisheries from August 10-14, 2015.
13	5 Days training program on Value Addition of Fish & Shell Fish organized by College of Fisheries from August 24-28, 2015.
14	Training course on Improving reproduction rate in ruminants by suitable reproductive technologies organized by ICAR Center of Advanced Faculty Training in Gynaecology and Reproduction cum Department of Veterinary Gynaecology and Obstetrics, GADVASU, Ludhiana from September 2-22, 2015.
15	28th advanced training course on Hands on Training in Specialized Procedures in Veterinary Anaesthesia and Surgery organized by Centre of Advanced faculty Training, Department of veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana from September 10-30, 2015.
16	Workshop on Advanced Clinical procedures in Veterinary Practice by Dr. Sherisse Sakals from Western College of Veterinary Medicine, Saskatchewan, Canada organized by Department of Veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana from November 3-7, 2015.
17	First National Conference of Society of Veterinary and Animal Husbandry Extension On Push to the Livestock Farming through Knowledge empowerment of the farmers organized by Veterinary and Animal Husbandry Extension Education, GADVASU, Ludhiana from November 18-20, 2015.
18	GIS Mapping & Data Analysis For Animal Health organized by School of Public Health and Zoonoses in collaboration with University of Sydney, Australia from November 26-28, 2015.
19	Application of Advanced Animal Health Management at field Level organized by Department of Veterinary Medicine in collaboration with Directorate of Extension, New Delhi from December 1-8, 2015.
20	Training programme on Imaging procedures in Veterinary Patients by Dr. Angela Hartman from New Zealand organized by Department of Veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana from December 14-18, 2015.
21	3 days Farmers training on Hygienic Poultry Processing and Value Addition for Employment Generation and Better Revenues organized by Department of LPT, GADVASU from December 16-18, 2015.
22	Hands on training on nutritional technologies for dairy farmers organized by Department of Animal Nutrition, GADVASU from January 11-15, 2016.
23	Disease prioritization and risk analysis organized by School of Public Health and Zoonoses in collaboration with University of Sydney, Australia from February 8-12, 2016.
24	International School on One Health: A team Science Approach for the protection of Animal, Human and Environmental Health organized by School of Public Health and Zoonoses in collaboration with University of Saskatchewan, Canada from February 9-15, 2016.

25	34th Annual Convention of Indian Society for Veterinary Medicine (ISVM) and National Symposium on "Newer Approaches in Diagnosis and Management of Animal Diseases for Sustainable Health and Production" will be organized by the Department of Veterinary Medicine, Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana from February 17-19, 2016.
26	Small scale milk and meat production for marginal farmers organized by Department of Animal Nutrition, GADVASU from February 23-27, 2015.
27	Pig farmer association meeting organized regularly on last Thursday of every month by Department of Veterinary and Animal Husbandry Extension Education.
28	Goat farmers association meeting organized regularly on first Friday of every month by Department of Veterinary and Animal Husbandry Extension Education.
29	Innovative fish farmers association meeting organized regularly on third Thursday of every month by College of Fisheries.

Awards and Honours

Name of the Faculty/ Student	Award/Honour
COLLEGE OF VETERINARY SCIENCE	
Animal Genetics and Breeding	
Simarjeet Kaur	Best Poster Presentation Award for "Livestock power: The energy and emission benefits of converting cow dung to biogas" during *National Conference of SVAHE* on "Push to livestock farming through knowledge empowerment of the farmers" to be organized by Society of Veterinary and Animal Husbandry Extension (SVAHE) at GADVASU, Ludhiana
	'Promising Dairy Breeder Award' during the celebrations of 'World Veterinary Day' organized by Vets Club and GADVASU, Ludhiana.
	Executive Member of Society of Conservation of Domestic Animal Biodiversity (SOCDAB)
Veterinary Pharmacology and Toxicology	
S Singla, VK Dumka, SK Sharma and AK Singh	Best Poster Award in Ist National Conference of Society of Veterinary and Animal Husbandry Extension (SAVHE), held at GADVASU, Ludhiana. Nov 18-20, 2015.
Simerjot Singh, Harpreet Singh, Pallavi Bhardwaj, Saloni Singla, V K Dumka and S K. Sharma	Best Poster Award in XV Annual Convention of Indian Society of Veterinary Pharmacology & Toxicology (ISVPT) held at NDRI, Karnal. Jan 14-16, 2016
H S Sandhu	Secretary Headquarters, Society of Toxicology of India Editor-in-Chief, Toxicology International
V K Dumka	Executive CommitteeMember, Society of Toxicology of India Managing Editor, Toxicology International Executive CommitteeMember, Indian Society of Veterinary Pharmacology and Toxicology
Rajdeep Kaur	Treasurer, Society of Toxicology of India
Veterinary Medicine	
B K Bansal	Best oral presentation award at ISVM conference, College of Veterinary & Animal Sciences, Pookot held from 22-24 Jan, 2015
Swaran Singh Randhawa	Second Award in poster presentation at ISVM conference, College of Veterinary & Animal Sciences, Pookot held from 22-24 Jan, 2015
Raj Sukhbir Singh	Best oral presentation award at ISVM conference, College of Veterinary & Animal Sciences, Pookot held from 22-24 Jan, 2015
Livestock Production Management	
A L Saini	Elected president of "Indian Society of Animal Production and Management"
Ankaj Thakur, D S Malik Sandeep Kaswan and A L Saini	Second best oral presentation award at International conference "Indigenous" 2016 at Hyderabad
Sarda Prasana Sahoo, Daljit Kaur, APS Sethi and Amit Sharma	Third best oral presentation award at International conference "Indigenous" 2016 at Hyderabad
Livestock Products Technology	
Manish Kumar Chatli	Fellow of Indian Association of Advancement of Veterinary Research

Name of the Faculty/ Student	Award/Honour
Teaching Veterinary Clinical Complex	
Vandana Sangwan	Bernstein travel fellowship from International Veterinary Radiology Association to attend the conference at Perth, Australia from 17-21 Aug 2015.
Raj Sukhbir Singh	1st best oral paper presentation award at 33rd Annual convention and National symposium of ISVM, 22-24 January 2015, Kerala Veterinary and Animal Sciences University, Pookode, Wayanad, Kerala
P S Mavi	Fellow of the Indian Society for Advancement of Canine Practice
Veterinary Anatomy	
Neelam Bansal	Best Lady Academician Award 2015, World Veterinary Day, Vets club, Ludhiana
Varinder Uppal	Best oral presentation award at 1st National Conference of Society for Veterinary and Animal Husbandry Extension held at GADVASU Ludhiana from Nov 18-20, 2015 Fellow of Indian Association of Veterinary Anatomists by IAVA
Veterinary and Animal Husbandry Extension Education	
Jaswinder Singh	Best poster award, in SVAHE Conference 2015 (18-20 Nov,2015) held at GADVASU, Ludhiana
Navdeep Singh	Best oral paper award in SVAHE Conference 2015 (18-20 Nov,2015) held at GADVASU, Ludhiana
Simrinder Singh Sodhi	Best oral paper award in SVAHE Conference 2015 (18-20 Nov,2015) held at GADVASU, Ludhiana
Rajesh Kasrija	Best oral paper award in SVAHE Conference 2015 (18-20 Nov 2015) held at GADVASU, Ludhiana
Veterinary Gynaecology & Obstetrics	
Sarvpreet Singh Ghuman	'Best Poster Presentation' award during 1st National Conference of Society for Veterinary & Animal Husbandry Extension (SVAHE)' GADVASU
M. Honparkhe, V K Gandotra, J S Matharoo, S P S Ghuman, D Dadarwal and J Singh	Prof Nils Lagerlof award, by The Indian society for the study of Animal Reproduction (ISSAR) for meritorious contribution to the research in Animal Reproduction at 31st Annual Convention of ISSAR held at Bengaluru
Sarvpreet Singh Ghuman	Best Research Paper Presentation' award during '31st Annual Convention of ISSAR and National Symposium on 'Current challenges and opportunities in animal reproduction' held at Veterinary College, Hebbal, Bengaluru on Dec 3-5, 2015
Dr Ranjna S Cheema	Best Research paper presentation award during XXXI Annual Convention of ISSAR and National Symposium on 'Current challenges and opportunities in animal reproduction' held at Veterinary College, Hebbal, Bengaluru on Dec 3-5, 2015.
Sumit Singhal	'Young Scientist Award' during National Conference on "Global research initiatives for sustainable agriculture & allied sciences (GRISASS) held at RVSKVV, Gwalior on December 12-13, 2015
Bilawal Singh	'Best Poster Presentation' award 1st National Conference of Society for Veterinary & Animal Husbandry Extension (SVAHE)' GADVASU
Veterinary Microbiology	
H M Saxena	Conferred National Excellence Award by Life Sciences Foundation, India, 2015
Veterinary Pathology	
C.K. Singh	Fellowship of Indian Association of Veterinary pathologists in 2015 for excellence in research and contributions in the field of Veterinary Pathology.
Pranoti Sharma, C K Singh, B S Sandhu, NK Sood, K Gupta and APS Brar	Second Best Paper of the Conference Award at the 16th National Conference of Association for Prevention and Control of Rabies in India (APCRI) held at Mysore in July 2014.
Animal Nutrition	
Jasmine Kaur	Best Poster Presentation Award in the National Conference of Society for Veterinary & Animal Husbandry Extension held from Nov 18-20, 2015 at GADVASU, Ludhiana.
Manjula Thakur, MS Pannu, Parminder Singh and Jasmine Kaur	First poster presentation award in the 3rd Biennial Conference of Indian Academy of Veterinary Nutrition and Animal Welfare held from Nov 4-5, 2015 at CSK HPKV, Palampur
Department of Animal Nutrition	First prize for stall competition in Kisan Mela/Pashu Palan Mela.

Name of the Faculty/ Student	Award/Honour
Veterinary Surgery & Radiology	
Singh SP, Singh SS, Singh T, Sangwan V and Saini NS.	Gold medal in Orthopedic Surgery Session of XXXVIII Annual Congress of ISVS held at College of Veterinary and Animal Sciences, SKUAST-K, Srinagar
Taksande PE, Saini NS, Singh T, Kumar A, Anand A and Verma, P.	Appreciation award in Small Animal Surgery Session of XXXVIII Annual Congress of ISVS held at College of Veterinary and Animal Sciences, SKUAST-K, Srinagar
Ashwani Kumar	International travel fellowship by Centre of International Cooperation in Science (CICS), Chennai, India
PallaviVerma, T Singh, J Mohindroo, M Raghunath and S S Singh	Best articles published in Intas Polivet Vol. 16 (2015) No. I Clinical Article "Surgical Management of Cleft Palate in pups"
Veterinary Parasitology	
L D Singla	Smt. Nisha Mani Parija oration award-2014 in recognition of valuable contribution and achievements in the field of Parasitic Zoonosis by Indian Association for the Advancement of Veterinary Parasitology, 2016
	International travel grant to attend 25th International Conference of World Association for the Advancement Veterinary Parasitology at Liverpool, England from August 16-20, 2015 by Department of Science and Technology, New Delhi.
	Certificate of appreciation from Dr. H.S. Sandha, Director Animal Husbandry, Punjab for best article entitled, "Management of parasitic infections in dairy animals" (In Punjabi) published in Pashudhan Punjab, April 2015 issue.
Mranalini Prerna N K Singh Harkirat Singh	Best oral presentation award in Session V (Technologies and Proven Practices for Sustainable Livestock production) in the 1st National Conference of Society for Veterinary & Animal Husbandry Extension (SVAHE), held at GADVASU, Ludhiana from November 18–20, 2015
School of Public Health and Zoonosis	
JPS Gill	Nominated as a member of scientific panel on Meat and Meat Products including poultry by Food Chain by Food Safety and Standards Authority of India
School of Animal Biotechnology	
Mamta Pandey, B V Sunil Kumar and Ramneek	Best paper award in National Seminar on "Translational research on biotechnology for improving animal health and production" & 3rd annual meeting of Society of Veterinary Science & Biotechnology
Mamta Pandey, B V Sunil Kumar and Ramneek	ISVIB Woman Scientist award in XXII annual convention of ISVIB (VIBCON-2015) GADVASU
Ratan K Choudhary	International Travel Support Scheme (ITS), Ministry of Science and Technology, DST, Govt of India
Naveen Saini	Young Scientist Award (2015) in National Seminar and 3rd Annual Meeting of Society of Veterinary Science and Biotechnology, organized by the Department of Veterinary Microbiology and Biotechnology, College of Veterinary and Animal Science, RAJUVAS, Bikaner, Rajasthan during October 7-8, 2015
Krishi Vigyan Kendra (KVK), Booh, Tarn Taran	
Navjot Singh, Prahlad Singh, Anil Kumar and Shashi	Best Poster Presentation Award at SVAHE Cof. GADVASU, Nov.18-20, 2015
Reseasonal Regional Research and Training Centre, Talwara	
Gagandeep Singh	Best Poster Presentation Award in SVAHE National Conference held at GADVASU, Ludhiana on Nov 18-20, 2015
COLLEGE OF DAIRY SCIENCE AND TECHNOLOGY	
N Veena	Best Poster Award in Dairy Product Development category of the poster in 44th Dairy Industry Conference organized by NDRI Karnal, February 18-20, 2016.
Pranav K Singh	Best Poster Award in Dairy Product Analysis & Shelflife Extension category of the poster in 44th Dairy Industry Conference organized by NDRI Karnal, February 18-20, 2016.

Name of the Faculty/ Student	Award/Honour
COLLEGE OF DAIRY SCIENCE AND TECHNOLOGY	
Asha Dhawan, Meera, D Ansal, Gurmeet Singh and Kulwinder Kaur	1st Success Story Prize at Indian Ecological Society International Conference 2016 held at SKUAST Jammu from February 18-20, 2016.
SN Dutta	3 months international training at Systemic Physiological and Eco-toxicological Research, Department of Biology, University of Antwerp, Belgium (11.01.2016 to 09.04.2016)
Meera D Ansal	Fellow of the Indian Ecological Society, Ludhiana
SN Dutta, Asha Dhawan, Meera D Ansal, Prabjeet Singh and AH Shanthanagouda	Best oral presentation award at Indian Ecological Society International Conference 2016 held at SKUAST Jammu from February 18-20, 2016.

Participation of Faculty in Conferences/ Symposia/ Workshop/ Trainings

International

S. No.	Name of the Conference/ Symposia/ Workshop/ Training	Name of the organizing agency and place	Dates during which held
1	Workshop on "Immunophysiology: Role of Immune Cells and Cytokines in Immunity",	Dairy Cattle Physiology Division, NDRI, Karnal.	March 23-24, 2015
2	Commonly used adulterants in Milk and Vegetables	International event on World Health Day organized by South East Asia region office of World Health Organization at New Delhi.	April 7, 2015
3	Workshop on "Epidemiological Study Design and Data Analysis"	School of Public Health and Zoonosis, GADVASU, Ludhiana in collaboration with The University of Sydney, Australia	April 13-15, 2015
4	Animal Husbandry Officer's Workshop	GADVASU, Ludhiana	June 26-27, 2015
5	ADSA-ASAS Joint Annual Meeting	American Dairy Science Association, Orlando, FL, USA	July 12-16, 2015
6	25th International Conference of WAAVP	World Association for the Advancement Veterinary Parasitology at Liverpool, UK	Aug 16-20, 2015
7	17th International conference on Veterinary Radiology	International veterinary radiology association, Perth, Australia	Aug 17-21, 2015
8	ITrap Summer School	University of Saskatchewan, Canada.	Aug 29-Sept 4, 2015
9	Training on Lost Harvest & Wasted Food	Centre for Development Innovation, WAGENINGEN, The Netherlands	Sept 14-25, 2015.
10	FAO e-Conference"Utilization of Food Loss and Waste as well as Non-Food Parts as Livestock Feed" moderated by Olaf Thiemeand Harinder P.S. Makkar	e-Conference	1st Oct 1-30, 2015.
11	Study mission to Germany on modern quality control and inspection systems	Asian Productivity Organization (APO), Tokyo in association with Organic Services GmbH, Germany, Berlin and Cologne, Germany	Oct 12-17, 2015
12	Indo Global Veterinary Summit	OMICS International, Hyderabad	Oct. 26-28, 2015
13	Indo Global Vaccines Summit	OMICS International, Hyderabad	Nov2-4, 2015
14	International Workshop on Advanced Clinical Procedures in Veterinary Practice	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana in collaboration with Western College of Veterinary Medicine, University of Saskatchewan, Canada	Nov 3-6, 2015

15	Workshop on "GIS Mapping and Data Analysis for Animal Health"	School of Public Health and Zoonoses, GADVASU, Ludhiana, India in collaboration with The University of Sydney, Australia	Nov 26-28, 2015
16	3 Months foreign training at Systemic Physiological and Eco-toxicological Research, Department of Biology	University of Antwerp, Belgium	Jan 1-Feb 9, 2016
17	Disease prioritization and risk analysis for Animal Health	GADVASU, Ludhiana in collaboration with The University of Sydney, Australia	Feb 8-12, 2016
18	International School on One Health: A team Science Approach for the protection of Animal, Human and Environmental Health	GADVASU, Ludhiana in collaboration with The University of Saskatchewan, Canada	Feb 9-15, 2016

National

S. No.	Name of the Conference/ Symposia/ Workshop/ Training	Name of the organizing agency	Dates during which held
1	National workshop on Proteomics and Structural Bioinformatics	Department of Animal Biotechnology, National Dairy Research Institute, Karnal,	March 23-25, 2015
2	National conference on Emerging trends in host microbe interactions	DAV University, Jalandhar	April 17-18, 2015
3	Annual Review Meeting and 'Annual Progress Report of the Outreach Programme on 'Estimation of Methane Emission under different Feeding Systems and Development of Mitigation Strategies'	NIANP, Bengaluru RAJUVAS, Bikaner	April, 17-18, 2015
4	Recent advances in improvement of vegetable crops in temperate regions	ICAR, IARI Regional Station KATRAIN	May 21-30, 2015
5	Workshop on Extension Methodology	PAMETI, Ludhiana	May 25-29, 2015
6	Training on Sample collection	Public Health Foundation of India in Collaboration with International Livestock research Institute (ILRI) in a collaborating research project with SPH&Z, GADVASU at Guwahati, Assam	June 1-5, 2015.
7	Research Methodology in Physical and Life Sciences	UGC-Human Resource Development Centre, Punjabi University Patiala	June1-20, 2015
8	Conference Indian Society for Advancement of Canine Practice,	Alllahabad UP	June 17-19, 2015
9	77th Orientation Programme	UGC- Human Resource Development Centre, Kurukshetra University, Kurukshetra	June 18-July 15, 2015
10	Advances in Processing, Value Addition and By-product Utilization of Livestock and Fish Produce	CIPHET, Ludhiana,	July 8-28, 2015
11	ICAR Sponsored Summer school on "Entrepreneurship development programme"	Department of Extension Education, PAU,Ludhiana	July 8-28, 2015
12	Advances in processing, value addition and by-product utilization of livestocks and fish produce.	ICAR-CIPHET, Ludhiana	July 8-28, 2015
13	Meeting of Nodal Officers	RDDL Jalandhar	July 16, 2015
14	One day training program 'Advanced Rheological Measurements'	PU, Chandigarh	July 17, 2015

S. No.	Name of the Conference/ Symposia/ Workshop/ Training	Name of the organizing agency	Dates during which held
15	National Conference of KVK-2015	ICAR, Patna (Bihar)	July 25-26, 2015
16	Novel approaches and technologies for processing and value addition of agricultural produce	ICAR-CIPHET , Ludhiana	August 4-24, 2015
17	Ornamental Fish Culture, Breeding and Aquarium fabrication	College of Fishery Sciences, GADVASU, Ludhiana	Aug 5-7, 2015
18	Fish Farming	College of Fishery Sciences, GADVASU, Ludhiana	Aug 10-14, 2015
19	Capacity building and project identification in agriculture and allied sector addressing climate change under SAPCC	PSCST, Chandigarh	Aug 11, 2015
20	Fish Processing & Value addition	College of Fishery Sciences, GADVASU, Ludhiana	Aug 24-28, 2015
21	39th Annual congress of ISVS and National symposium on "Recent Innovations in diagnosis and treatment of surgical disorders in ruminants and equines with particular applicability in hilly terrain"	Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Srinagar,	Sept 1-3, 2015
22	Nanobiology and Regenerative Therapies in Animal Health and Production	CAFT in Veterinary Physiology Division of Physiology and Climatology ICAR-IVRI	Sept 1-21, 2015
23	Improving Reproduction Rate in Ruminants by Suitable Reproductive Technologies	Department of Veterinary Gynaecology and Obstetrics, COVS, GADVASU, Ludhiana, India	Sept 2–22, 2015.
24	Advanced Refresher/Orientation Training course on Hands on Training in Specialized Procedures in Veterinary Anesthesia and Surgery	Department of Veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana.	Sept10-30, 2015
25	ICAR sponsored short course on "Recent concepts in Bull fertility assessment and quality semen production for improving fertility in farm animals"	ICAR, NIANP	Sept 14-23, 2015
26	Improvement of vegetable crops using biotechnological approaches	ICAR, IARI New Delhi	Sept 18-Oct 8, 2015
27	Instrumentation involved in quality assurance of milk and milk products	Centre for Advanced Faculty Training in Dairy Processing; Dairy Chemistry Division, ICAR-National Dairy Research Institute, Karnal	Oct 3-23, 2015
28	ICAR sponsored Winter School on "Current concepts and frontier technologies for fertility management in farm animals"	ICAR-National Dairy Research Institute, Karnal	Oct 5-25, 2015
29	Workshop on "Potential of Sahiwal Cattle in Punjab"	Sahiwal Cattle Society in collaboration with Animal Husbandry & Dairy Department, Punjab and GADVASU	Oct 6, 2015
30	National conference on innovative techniques in food products and processing technologies	Sant Longowal Institute of Engineering and Technology, Longowal (Sangrur)	Oct 9-10, 2015
31	Effect of climate change on productive & reproductive performance of dairy animals	Pandit Deen Dyal Upadhyaya Pashu Chikitsa Vigayan Vishwavidyalaya Evam Go-Anusandhan Sansthaan (DUVASU) Mathura UP	Oct 28-Nov 4, 2015

S. No.	Name of the Conference/ Symposia/ Workshop/ Training	Name of the organizing agency	Dates during which held
32	Training in Veterinary Surgery	Department of vety surgery and radiology with Surgeon (DR Serisse Sakals) from Suskechewn, Canada	Nov 4-6, 2015.
33	Meeting of Nodal Officers	UT Chandigarh	Nov 17, 2015
34	Analysis of High Throughput Sequencing And Microarray Data to Unravel Host-Pathogen Interactions	Biotech Division, IVRI, Izatnagar, UP	Nov 17-Dec 7, 2015
35	Advanced techniques and novel approaches for quality and safety evaluation of dairy foods	ICAR-National Dairy Research Institute, Karnal	Nov 17– Dec 7, 2015
36	First National Conference of Society for Veterinary & Animal Husbandry Extension on "Push to the livestock farming through knowledge empowerment of the farmers"	Department of Veterinary and Animal Husbandry Extension Education, GADVASU, Ludhiana	Nov 18-20, 2015
37	Winter school on "Recent advances in development of automatic systems/machines for secondary agriculture".	ICAR-CIPHET, Ludhiana	Nov 18 to Dec 8, 2015
38	Stakeholders- Consultation Workshop for Upscaling of Doable Rainfed Technologies in the Domain Districts of AICRPDA Centre, Ballowal Saunkhri	Regional Research Station Ballowal Saunkhri	Nov 19, 2015
39	Annual Convention of the Indian society for study of Animal Reproduction and National Symposium on Research and innovation to improve animal fertility and fecundity	DUVASU, Mathura, U.P.,	Nov 20-22, 2015
40	21 days CAFT training programme on: Designing New Age Dairy Foods	ICAR-National Dairy Research Institute	Nov 28-Dec 18, 2015
41	Workshop on rabi season pulses	ICAR-ATARI Zone-I, Ludhiana HAU, Hisar	Dec 1-2, 2015
42	Model training course on "Application of advanced diagnostic and therapeutic tools for animal health management at field level" Sponsored by Ministry of Agriculture & Farmers Welfare Government of India	Department of Veterinary Medicine, GADVASU, Ludhiana	Dec 1-8, 2015.
43	31st Annual Convention of the Indian Society for Study of Animal Reproduction (ISSAR) and National Symposium on 'Current challenges and opportunities in animal reproduction'	Veterinary College, Hebbal, Bengaluru.	Dec 3-5, 2015
44	National Conference on "Global research initiatives for sustainable agriculture & allied sciences (GRISASS)	held at RVSKVV, Gwalior	Dec 12-13, 2015
45	Training on Veterinary Radiology	Department of vety surgery and radiology with radiologist, diplomat (Dr Angela Hartman) from New Zealand	Dec 14-18, 2015.
46	XXII Annual convention of ISVIB and National Symposium on Immunomics and Proteogenomics in Livestock Health and Productivity	LUVAS, Hiasr	Dec 17-19, 2015
47	"Applications of Computer Algorithms and Statistical Software Packages in Agriculture" 21 day ICAR sponsored CAFT program	IASRI, New Delhi	Dec18, 2015-January 7, 2016

S. No.	Name of the Conference/ Symposia/ Workshop/ Training	Name of the organizing agency	Dates during which held
48	One day district level Training and capacity building program on Biodiversity issues and Biological Diversity Act, 2002	Punjab Biodiversity Board Circuit House, Ludhiana	Dec 29, 2015
49	15th Annual Convention of Indian Society of Veterinary Pharmacology & Toxicology (ISVPT) on "Nutritional Pharmacology and Toxicology beyond Calories"	NDRI, Karnal	Jan 14-16, 2016
50	Policy Planning for Livelihood Security Through Domestic Animal Biodiversity	SOCDAB, SKUAST-Jammu, J&K	Feb 11-12, 2016
51	34th national conference of Indian Society of Vety. Medicine (ISVM)	Department of Veterinary Medicine, GADVASU, Ludhiana	Feb 17-19, 2016.
52	49th annual convention of ISAE & symposium on engineering solutions for sustainable agricultural and food processing.	Punjab Agricultural University, Ludhiana	Feb 23-25, 2015
53	Food processing and technology: current status and future	Shoolini University in collaboration with NABARD & DST	Feb 26, 2016.

Visitors to the University

S. No.	Name and other details about the visitor	Date of Visit
1	Prof. Micheal Hess, Vienna (Austria)	April 20, 2015
2	Dr. Jim Geltch, CEO, Nuffield, Australia Farming Scholars	June 12, 2015
3	Mr. Gurcharan Singh, Director, State Fisheries Department, H.P.	June 23, 2015
4	Dr. Rajbir Singh (Director ATARI)	June 24, 2015
5	Dr. H. P. S. Makkar, Animal Production Officer, Food and Agriculture organization (FAO), Rome.	July & Aug, 2015
6	Dr Harpreet S Kochhar, chief Veterinary officer Canada of Canadian Food Inspections Agency Ottawa, Canada	Aug 2015
7	Dr. Umesh Singh and Dr. S.K. Tyagi from ICAR-CIRC, Meerut (U.P.) to evaluate the AICRP on cattle-DRU-Sahiwal	Sept 10-12 , 2015
8	Dr. Niranjan Matam, Principle Scientist ICAR-DPR, annual inspectional visit to Ludhiana Center, AICRP on Poultry Breeding	Oct, 2015
9	National Bull selection committee from ICAR-CIRB and NDRI under the project NWP(B)-Murrah	Nov 16, 2015
10	Inspection team from Veterinary Council of India	Dec, 2015
11	Dr. Inderjit Singh, Director, CIRB, Hisar	Dec, 2015
	Brigadier Sahib Singh Sandhu, Sena Medal, NCC Group Commander	Jan 6, 2016
12	Delegation from Bangladesh (Ministry of Fisheries and Livestock Bangladesh)	Jan 20, 2016
13	Dr. Gurbachan Singh, Chairman of ASRB, New Delhi	Jan, 2016
14	Delegation from Nepal	Feb 2, 2016
15	Professor Michael Ward, Chair, Veterinary Public Health & Food Safety, Faculty of Veterinary Science, The University of Sydney, Australia	Feb 8-12, 2016

List of Research Schemes Operational during 2015-16

Non Plan Schemes	
1	Director of Research
2	Research Facilities for Dairy Cattle and Buffalo Breeding
3	Genetic Improvement of Egg-type Stock
4	Recovery, Cryopreservation and Embryo Transfer in Buffaloes and Crossbred Cattle
5	Germplasm Multiplication of Egg-type Poultry Stocks
6	Physical Facilities of Breed Quails for Meat and Egg
7	Additional Facilities for Modernization of Diary Operations
8	Advanced Research Centre for Buffalo Reproduction
9	Rearing of Buffalo Male Calves for Meat
10	Introduction and Breeding of Naked Neck/Rhode Island Red and Other Miscellaneous Stocks of Poultry
11	Molecular and Cytogenetic Studies on Animals for Faster Genetical Gains
12	Intensification of Research in Animal Nutrition
13	Improvement of Buffalo and Crossbreed Cattle through Nutrition Effect of Plans of Nutrition on their Growth Rate Age at Puberty, Pregnancy and Lactation
14	Seed Production in Forage Crops
15	Establishment of Research Laboratory for Feed Evaluation and Processing
16	Improvement of Forages and Establishment of Forage Unit
17	Establishment of Research-cum-Quality Control Laboratories for Feed for Livestock/Poultry Farmer and Feed Manufacturers
18	Establishment of Small Animal Colony
19	Creation of Facilities for Rearing of Meat Animals i.e. Goat, Pig and Rabbit
20	Studies on Utilization and Popularization of Processed Meat Products Prepared from Buffaloes and Other Species
21	Anatomical, Histological, Histro-Chemical, Electron-Microscopic Studies as Related to Hormonal and Biochemical Profile in Female Reproductive Organs in Buffalo
22	Internal Diseases of Dairy Animal their Clinico Pathological Diagnostic and Therapeutic Aspect
23	Nutritional Deficiency Diseases of Dairy Animal and their Clinico Pathological Diagnostic and Therapeutic Aspect
24	Animal Disease Research Centre and Strengthening of Diagnostic Facilities & Experimentation
25	Reproductive Biology, Ecology, and Management of Birds and Mammals
26	Reproductive Disorders in Dairy Animals
27	Studies on Viral Bacterial and Mycotic Infection of Cattle and Buffaloes with a View to Develop Diagnostic Test and Suitable Vaccines
28	Research on Poultry Diseases
29	Establishment of Research-cum-Diagnostic Laboratory for Rabies
30	Immunological Studies on the Helminthic Diseases of Livestock
31	Immunological Control of Cattle Tick (Boophilus microplus)
32	Toxicity Studies of Insecticide in Livestock
33	Research on Diagnostic Aids & Surgical Treatment of Muscule Skeletal and Abdominal Disorders in Large Animals
34	Strengthening of Fisheries Research in Gadvasu
35	Fisheries Research Scheme

36	Establishment of Regional Research Centre for Nili Ravi Buffalo
37	Sustainable Aquaculture Technology for Salt-Affected/Water-Logged Areas of Punjab
38	Regional Livestock Research Centre at Bathinda
39	Regional Livestock Research Centre at Kapurthala
40	Control of Mastitis in the Punjab State- A Pilot Project
41	i. State Share in Aicrp & Other Schemes on Sharing Basis, ii. State Share on Account of Personal promotion in Icar & Other Agency Shcemes, iii. State Share for Works/ROC Financed by ICAR & Other Agencies iv. Arears of Employees and Provision for Vacant Posts
ICAR	
1	Strengthening and Development of Agricultural Education" in Agricultural Universities"
2	Award of App. & Internship for BVSc & AH Programme
3	Centre of Advance Faculty Training (CAFT) in Vety. Gynaecology & Obstetrics
4	Network Project on Buffalo Improvement (Main Unit)
5	Network Project on Buffalo Improvement (Field Unit)
6	Project Directorate on Cattle field progeny testing project
7	All India Cordinate Research Project on Poultry Breeding
8	AICRP on Cattle- New Project Sahiwal (Data Recording Unit)
9	AICRP on Estimation of methane emission under different feeding systems and development of mitigation strategies
10	Project Directorate on animal disease monitoring & surveillance
11	Niche Area of Excellence (NAE), 'Inland aquaculture in Punjab
12	Centre of Advance Faculty Training (CAFT) in Vety. Surgery & Radiology
13	Establishment of a New Krishi Vigyan Kendra at Village Panchayat Booh, Tarn Taran District of Punjab
14	Establishment of a New KVK at Village Majra, Sahibzada Ajit Singh Nagar, (Mohali), District of Punjab
15	Establishment of a New KVK at Village Handiaya Barnala, District of Punjab
16	All India Network Programme on H.Septicaemia
17	AICRP on Nutritional and Physiological Approaches for Enchancing Reproductive Performance in Animals
18	National Talent Scholarship in Agricultural Universities
19	Niche Area of Excellence- Animal Disease Registry and Tissue Bank
20	All India Network Programme on Diagnostic Imaging and Management of Surgical conditions in Animals
21	Outreach Programme on Zoonotic Diseases
22	ICAR-24: Monitoring of Drug Residues and Environmental Pollutants
23	Kissan Sammelains, Krishi Melas, Kisan Ghosties, (2015-16)
24	Kissan Sammelains, Krishi Melas, Kisan Ghosties, (2015-16)
25	Junior Research Fellowship & ICAR-Senior Research Fellowship to post graduate students (M.V.Sc. & Ph.D) (2015-16)
26	Frontline demonstration on pulses under KVK-Tarn Taran (2015-16)
27	Frontline demonstration on pulses under KVK-Majra, (2015-16)
28	Frontline demonstration on pulses under KVK-Handiaya, (2015-16)
29	Procurement of soil testing kit and its operational expenses for KVK Tarn Taran, (2015-16)
30	Kisan Sammelains, Krishi Melas, Kisan Ghosties, Group Meetings and Displaying Exhibitions and Demonst. of Technologies for the benefits of farmers and for giving wider publicity during pre-Rabi 2015 at KVK, Tarn Taran
31	Kisan Sammelains, Krishi Melas, Kisan Ghosties, Group Meetings and Displaying Exhibitions and Demonstrations of Technologies for the benefits of farmers and for giving wider publicity during pre-Rabi 2015 at KVK, Barnala
32	Strengthening of Directorate of Extension Education (374)

33	Nanoencapsulation of Resveratrol and its stability antioxidant activity and bioavailability in selective traditional dairy products for health benefits
34	Designing a Digital Model to promote cooperative learning for producing high quality dairy professionals
35	Extension tools for strengthening technical support to fish farmers (377)
36	Exploring the Gaps in veterinary education in india to match the graduate skills with stakeholders level
37	Comparative economic valuation and empirical assessment of salient characterstics of indigenous cattle vis-a-vis bred cattle in state of Punjab a prelude to economic incentive
38	Training Programme under the purview of Unnat Bharat Abhiyan for the year 2015-16
39	Training Prg. under the purview of Unnat Bharat Abhiyan for the year 2015-16
40	Trg.Programme under the purview of Unnat Bharat Abhiyan for the year 2015-16
41	Creating awareness on new agricultural technologies and information generated by research and development departments and also orient them towards various agricultural schemes recently launched Pradhan Mantri Fasal Bima Yojna for the year 2015-16
42	Creating awareness on new agricultural technologies and information generated by research and development departments and also orient them towards various agricultural schemes recently launched Pradhan Mantri Faima Yojna for the year 2015-16
43	Creating awareness on new agricultural technologies and information generated by research and development departments and also orient them towards various agricultural schemes recently launched Pradhan Mantri Fasal Bima Yojna for the year 2015-16
UGC	
1	Role of Antiperm Antibodies in infertility/repeat breeding of Cattle
2	Toxicokinetics of pyrethroids
3	Development of a DIVA assay for differentiation of Hemorrahagic Septicemia infected from vaccinated cattle and buffaloes
4	Comparison of Canine Parvovirus Vaccince strain with field isolates by gene sequencing
5	Epidemiological Study on goat mastitis in north-western states of India.
6	Immunohistochemical localization of estrogen and progesterone receptors in female genitalia of Buffalo
7	Studies on intra-vitam diagnostic approaches of Rabies in animals.
8	Studies on lymphangiogensis in canine model of human breast cancer
9	Development of probiotics for fish and shellfish
10	Studies on the freshwater pearl musel culture under agro-climatic conditions of Punjab
11	Standardization of culture technology of duckweed (Lemna sp.) and
12	Ameliorative Measures for Enrofloxacin- Induced Testicular Toxicity in Rats
13	Heavy metal exposure vis-à-vis reproductive performance in buffaloes
14	Development of user friendly diagnostic kit for marek's Disease
15	Polymorphism screening and association studies of CXCR genes with udder health and milk production in Buffalo breeds of Northern India.
16	Studies on cloning and Expression of Heat shock proteins (Hsps) of Brucella spp. and their Immunological Characterization in Experimental Animals.
17	Molecular epidemiological characterization and diagnostics of human brucellosis, a major Zoonotic disease
18	Molecular epidemiology & diagnostic of pig transmitted (Zoonoses)human parastic
19	Development of Biochemical assay as diagnostic tool for synthetic pyrethroid resistance in cattle tick Hyalomma anatolicum anatolicum
20	Development of control strategies based on molecular epidemiology and drug efficacy for equine piroplasmosis in punjab
21	Colour Doppler studies on major blood vessels in dairy animals
22	Persistent organic Pollutants in Fish, Fish pond Sediments and Water: Health Risk Assessment through Dietary Exposure
23	Influence of exposure to new generation insecticides on the disposition of antimicrobial agents
24	Training programme of Dr.Wagh Rajesh Vishwanath

25	Raman Post Doctoral Fellowship for the Post Doctoral Studies in USA under Indo US21
26	Development of a single multiplex PCR for identification of mastitis causing microorganisms alongwith antibiotic resistant gens against commonly used antibodies in dairy animals
27	Development of extended storage life functional meat products by incorporating bioactive phyto-extracts
28	Standardization of breeding and rearing technology of high value vulnerable catfish Pangasius pangasius under agro-climatic condition of Punjab
29	Clinical application of bone marrow derived mesenchymal stem cells from buffalo for allogeneic and xenogeneic cutaneous regeneration of chronic wounds
MISC. SCHEMES	
1	Development of a prototype for mechanized manufacture of composite dairy product-Pinni (SERB)
2	Confirmation of lactation performance and animal safety of dairy animals of the Bos sp. and Bubalus sp. treated with recombinant bovine somatotropin (ELI LILY ASIA BANGALORE)
3	DBT Network Project on Brucellosis (DBT)
4	Funds for improvement of S&T infrastructure in Universities and Higher Educational Institutions (FIST)- To augment the post graduate research facilities in the department", (DST, Department of Veterinary Microbiology)
5	DBT Network Project on Brucellosis (DBT)
6	Development and evaluation of sero-diagnostic assay for timely Diagnosis and Prognosis of mammary tumors, (RGYI)
7	Funds for improvement of S&T infrastructure in Universities and Higher Educational Institutions (FIST)- To augment the post graduate research facilities in the department", (DST, Animal Biotechnology)
8	Effect of single and multiple exposures poultry farm air on pulmonary defense of poultry workers (ICMR)
9	Aetio-Pathology and molecular epidemiology of bacterial and viral diseases associated with the respiratory problems of Yak in the North Eastern Region of India (DBT)
10	Development of virus-like particle (VLP) of Japanese encephalitis virus as a potential vaccine candidate (DBT)
11	HRD Programme in M.Sc/M.V.Sc (DBT)
12	Studies on fibronectin binding outer menbranes proteins of pasteurella multocida: role in extra cellular matrix (ECM) adhesion and pathogenesis in bubalus bubalis (SERB)
13	Community awareness project for prevention and control of Zoonoses (DST)
14	Development of Fortification Technology for Milk to Increase Bioavailability of Mineral (MOFPI)
15	Development of subviral particle of Japanese encephalitis virus (JEV) as candidate vaccine against JEV (DAE, GOI)
16	Xanthosine treatment; A novel strategy to increase milk production and mammary stem cells (DBT)
17	Production and evaluation hyperimmune sera and monoclonal antibodies (mabs) against immunodominant antigens of opportunistic Gram-ve pathogen Pseudomonas aeruginosa (ICMR)
18	Funds for improvement of S&T infrastructure in Universities and Higher Educational Institutions (FIST)- To augment the post graduate research facilities in the department", (DST, Department of Veterinary Medicine)
19	TLR-Ligands: To Design Novel Vaccines Adjuvants against New Castle Disease in indigenous Chicken (DBT)
20	Combined use of novel diagnostic tools and strategic vaccination to control bovine brucellosis in endemic areas (DBT)
21	Combined use of novel diagnostic tools and strategic vaccination to control bovine brucellosis in endemic areas (DBT)
22	Development of subviral particle of infectious bursal disease virus as a potential vaccine and diagnostic candidate" (DBT)
23	Encapsulation of Natural Bioactive Compunds and Micronutrients for the Enhancement of Nutritive, Preservative and Processing Functionality of Meat Products " (SERB)
24	Value addition of whey and pearl millet in the development of functional gluten free foods" (SERB)
25	Isolation and Charaterization of Dairy Flora of Punjab Region as probiotic with Bio-therapeutic Potential and Development of Presevation Technology for Ready to use cultures (SERB)
26	Research Training Fellowship for Developing Country Scientists (RTF-DCS)2015-16 (Centre for Sci & Tech. for NAM S&T)
27	Surveliance of anti microbial resistance (AMR) in microflora of milk and dairy cattle from organized and unorganized dairy sector of Punjab region(2015-16)(SERB)
28	Addressing Bovine tuberculosis at the Human-Animal interface and Veterinary Antibiotic use in Small Holder Peri-Urban Dairy Farms in India to Ensure Safe and Sustainable Milk Production 2015-16 (PHFI)

29	One health reinvented: can we predict brucellosis prevalence in bovines from that in humans (2015-16)(University of Sydney)
30	Evaluation of diagnostic assays for quicker diagnosis of mycobacterial infections in cattle and buffaloes (2015-16)(DBT)
31	Model Training course on application of advanced diagnostic and therapeutic tools for animal Health management at field level Dec-1-8-2015 (2015-16)(GOI, Ministry of Agriculture & Farmer Welfare)
32	Studies on epithelial-mesenchymal transition (EMT) inacute and chronic lung injury 2015-16 (SERB)
33	Studies of microbial diversity and potential human pathogens in freshwater aquaculture environment (SERB)
35	Characterization of Antimicrobial peptide genes in buffaloes in health and disease (DBT)
36	Rapid and confirmatory detection of important animal meat based food borne pathogens and its associated toxicants and natural toxicants by using immunohistopathological and molecular techniques- A step towards one health (SERB)
37	Comprehending the role of mucosal associated immunity during host pathogen interaction following Avibacterium paragallinaruim infection in poultry (Chicken and Japanese quail) for developing a futuristic mucosal vaccine (SERB)
38	Development of farmer level monoclonal antibody based flow through immunoassay for detection of Vibrio arahaemolyticus-the causative agent of shrimp EMS (SERB)
39	An assessment of the role of mitochondria in bovine mastitis,2016-17 (DST)
40	To Study effect of herbal formulation during transition period on oxidative status in dairy animals (Indian Herbs Specilities ltd. Noida)
41	Creation of State of Art institute for Sahiwal Breeding Farm at RRTC Kaljharani (PLDB)
RKVY AND OTHER SCHEMES	
1	Sustainable livestock dairy and fishery farming for food security and economic prosperity through need based and problem oriented research (RKVY-7)
2	Addressing the challenge of increasing production from livestock, diary and fishery farming thematic research (RKVY-9)
3	Establishment of skill development centre (RKVY-10)



Integrated Fish cum Duck Farming

RESEARCH PUBLICATIONS

1. Anh Q, Thai N, Sharma N, Luong D H, Sodhi S S, Kim J, Kim N, Oh S and JeongD. 2015. Targeted inhibition of osteosarcoma tumor growth by bone marrow-derived mesenchymal stem cells expressing cytosine deaminase/5-fluorocytosine in tumor-bearing mice: Anti-tumor activity of CD/5FC-MSCs. *The Journal of Gene Medicine* 17(3-5) doi: 10.1002/jgm.2826
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14. Bhat S A, Singh H, Singh N K and Rath S S. 2015. Molecular detection of *Babesia bigemina* infection in apparently healthy cattle of central plain zone of Punjab. *Journal of Parasitic Diseases* 39(4): 649–53.
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National and International Linkages

- Network programme on Brucellosis
- All India Network programme on Haemorrhagic Septicaemia
- "International School on One Health: An Integrated View on Infectious Diseases, Food Safety and Zoonoses" organized in collaboration with University of Saskatchewan, Canada.
- MOU signed between CFAP, CFIA, Canada and GADVASU, Ludhiana.
- Collaborative project with University of Sydney, Australia
- Network project on Diagnostic imaging and Surgical management in collaboration with Department of Surgery and Radiology, IVRI, Chennai, Bikaner and Mathura
- Outreach programme on "Estimation of methane emission under different feeding systems and development of mitigation strategies", ICAR
- CIBA (ICAR), Chennai. Supply of brackish water finfish/shellfish and technical support. Since 2012
- CIFA (ICAR), Odisha. Supply of catfish seed and technical support. Since 2014
- CIFE centre, Rohtak, Haryana. Supply of freshwater prawn/brackish water shrimp seed and technical support. Since 2012
- MOU signed with Freshwater Fisheries Research Center (FFRC) on September 23, 2015Wuxi, China. Faculty and Student exchange programme for sharing of scientific information and acquiring advanced training in fisheries
- Collaboration with IGFRI, Jhansi (National Initiative on Fodder Technology Demonstration project is under progress with KVK) – Three year project (2014-16)
- Dr Umesh Kumar, PI-Indigenous Breeds Project Central institute for Research on Cattle, Merrut Cantt, UP.
- Dr. A.K. Mishra, PI- Characterization of Kajali Sheep in its native tract, NBAGR, Karnal.
- MoU signed with the M/s Chadha Sales Pvt. Ltd. Of Delhi for commercialization and popularization of PCM based milk chiller developed by the Department of Dairy Engineering.
- A joint research project has been submitted to MoFPI, New Delhi in collaboration with German based company R-BIOPHARM Neugen Private Limited, Hyderabad.

Memoranda of Understanding (MoU)



Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana signed MoU with Fresh Water Fisheries Research Centre (FFRC), Wuxi, Jiangsu Province, Republic of Chinafor giving impetus to 'Blue Revolution' across the state. The MoU was signed on the initiative of S. Parkash Singh Badal, Honorable Chief Minister, Punjab. The MoU will help in upgrading existing technologies for enhancing production/productivity of confine and capture resources of the state and will also help the university in capacity building, to cater skilled human resource requirement, through faculty and students exchange programme with FFRC, Wuxi. This MoU will certainly give the much needed lift to state's ambitious programme of agricultural diversification through aquaculture.

Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana signed MoU with University of Sydney, Australia for collaborative research and to facilitate exchange of faculty and students. It is the first-of-its-kind MoU signed by any



Veterinary University in Asia with University of Sydney and will encourage student and faculty exchange besides promoting research collaborations. The University of Sydney has also funded a 'One Health' project to improve health of livestock and people in contact with the livestock.











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