

Vision 2030



**Livestock
Improvement**

Extension Activities

Research Priorities

**Veterinary
Education**



**LALA LAJPAT RAI
UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES
HISAR 125004**

Vision 2030



**Directorate of Research
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HISAR 125004**

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Maj. Gen. Shri Kant, SM, VSM (Retd.)

Vice- Chancellor



FORWARD

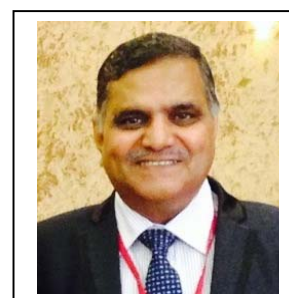
Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS) was established by Haryana Legislature Act No. 7 of 2010 after carving out from Chaudhary Charan Singh Haryana Agricultural University, Hisar on December 1, 2010. Since its inception, LUVAS has continued its focus on teaching, research and extension related to livestock and poultry for the ultimate benefit of dairy farmers in Haryana through its multifarious activities. In a short span of less than six years, LUVAS has touched greater heights in academics as well as transferring laboratory research to the animal owners through extension activities with the sole aim of targeting service to the farmers through 'One World, One Health' concept of World Health Organization.

It gives me an immense pleasure to put forward LUVAS VISION 2030. I strongly believe that the concepts presented in the present document will prove useful for the development of veterinary, dairy and animal husbandry sectors in the state of Haryana, ultimately prospering our country. In WTO era, under SPS agreement, strict hygienic measures have to be followed for production of food items including food of animal origin, as also envisaged by FSSA Act 2006. Liberalized international trade and climate change have further highlighted the importance of sustainable livestock farming and production of food from animal and poultry origin. Keeping this in mind, the newly established LUVAS endeavors to adopt modern technologies for protection and improvement of animal health and production and to develop world class Veterinary education.

LUVAS VISION 2030 has been brought to address future challenges for the growth and development of Animal Husbandry sector in Haryana for years to come in terms of food from animals and poultry origin as well as income to the dairy and poultry farmers. The success of FMD Control Programme in Haryana during last decade, development of newer diagnostics for economic important diseases of veterinary importance and modern surgical, gynaecological and clinical techniques for effective and timely treatment of animals are some of the proud achievements. Likewise, the newly developed breeds viz. Hardhenu (cattle), harnali (sheep) and Harlay (poultry) by our Scientists through intensive research of more than four decades are a step forward in this direction. These animals shall provide significant contribution towards economy of the dairy farmers as well economy of the state.

(Shri Kant)
Maj. Gen. (Retd.)

Dr. Ravindra Sharma
Ph.D. Liverpool, UK
Director of Research



PREFACE

It is through vision that innovation is conceived; through will power it is then materialized.

-Wayne Chirisa

Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS) is committed for the welfare of state of Haryana through harnessing the scientific knowledge and developing technical advancement for improved animal health and production. Apart from the development of modern diagnostics, effective treatment regimens and animal productivity enhancement, the Scientists of the university are engaged in integrated scientific research and studies on various aspects of veterinary, animal husbandry and dairy sciences addressing climate change issue with proven impact on animal welfare, value added dairy products and improved animal feeding practices to lower down feed wastages. The technical advancements in livestock health strategies (diagnostics and treatment), production and management are the key research areas of concern.

Since its establishment in 2010, the university has expanded its research and academic initiatives through signing of Memorandum of Understandings (MOUs) both at national and international level to promote collaborative research on important aspects of veterinary and animal sciences. The LUVAS has been striving all these years to achieve its scientific goals through research grants from State (Plan and Non-Plan), Self-financed and other outside agencies viz. ICAR, RKVY, DBT, MOFPI, UGC, BBSRC (U.K.), etc. The new technologies developed in different areas are being transferred through effective communication channels, to the ultimate beneficiaries *i.e.* livestock farmers, dairy entrepreneurs, extension functionaries and industry, thus taking the university research at the farmer's doorstep.

The challenges of future including need for the rapid diagnostic tools, prevention and control of infectious diseases, improved productive efficiency demand extensive research and adaption of integrative approaches in frontier areas. Keeping these points in view LUVAS has formulated its VISION 2030 with its commitment to the society. Through this document, the Scientists of LUVAS aim to take up research in priority areas to improve animal health, welfare and productivity, eventually leading to sustainability and security of the food chain.

I take this opportunity to heartily thank Dr. P. K. Kapoor, Coordinator Research, Planning and Monitoring for giving shape to this document in the present form. My sincere thank are also due to Dr. Vinay Joshi, Dr. Swati Dahiya, Dr. Vijender Singh, Dr. Subhasish Sahu, Dr. Vikas Nehra, Dr. Naresh Kakker, and Dr. Rajesh Chhabra for their all round efforts for editing and incorporating useful suggestions in the document. I also convey my sincere appreciations and thanks to all the Deans, Directors, other Officers and Head of Departments of the University for providing their valuable contributions for publication of LUVAS VISION 2030.

Ravindra Sharma

BACKGROUND

Livestock is an integral component of livelihood, social transformation, women empowerment, employment and regular income generation in rural India. Liberalized international trade and climate change has further highlighted the importance of livestock farming. It is predicted that by 2020 livestock would be the most important sector in terms of value-added commodity. To meet the future needs and sustain animal production, research should utilize modern technologies for enhancing livestock production. Although India has made significant progress in animal production and food safety in the last few decades, improvement in veterinary services is needed to meet the increasing demands for which more trained Veterinarians are required.

Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar established on 01 December 2010, has been playing a crucial role in the development of livestock sector as an instrument of rural development through its multifarious activities. The broader mandate of the university is to improve animal health and increase production through education, research and extension in Veterinary and Animal Sciences. The teaching, research and extension activities in the university are aimed at catalyzing environment friendly sustainable animal health and production along with farmer education leading to poverty alleviation and up-liftment of farmers. Sensing this need, LUVAS endeavours to adopt modern technologies for protection and improvement of animal health and production and to develop world class Veterinary education.

LIVESTOCK SECTOR AT A GLANCE

The Father of Nation Shri Mahatma Gandhi once told that “India is a country side and Agriculture is the back bone of the country” which reflects the importance of agriculture and its allied sector towards growth as well as nutritional security of the country. Ever increasing population, urbanization, industrialization, climatic change and many more which threaten the sustainability of agriculture, livestock sector in other way provides a great avenue for a source of income to a large chunk of the society. As it is evident from the national report where Agricultural GDP to the total GDP are in a continuous decreasing trend, its allied sector including dairy and fishery shows an upright trend for the last few years. The livestock sector alone contributes nearly 27.25% of Value of Output at current prices in Agriculture, Fishery and Forestry. The overall contribution of Livestock Sector in total GDP is nearly 4.11% at current prices during 2012-13 indicating its importance in the Indian economy.

India is bestowed with huge livestock population of 512.05 million numbers (BAHS 2014) spreading over a total geographical area of 32,87,240 sq km with much biodiversity including some of the excellent breeds of cattle and buffalo known for. Some of the states are truly regarded as a hub for the dairy contributors to the national pool because of excellent dairy breeds of cattle and buffalo they contain, constituting only 1.3% of the country's geographical area. Haryana is blessed with some of the best breeds of cattle and buffaloes in the country. The State is well known for the native tract of world famous "Black Gold" (Murrah buffalo) and "Haryana" (Cattle) for their excellence in milk production and dual character, respectively.

As per Livestock Census-2012, livestock population of the State is 88.19 lakh including 18.08 lakh cattle and 60.85 lakh buffaloes, being catered by 2,799 veterinary institutions spread over the entire State. Out of total buffalo population (108.7 million no.), Haryana occupies 7th position, contributing 5.60% (6.08 million no.) to nation and there is an increase of 2.22% of buffalo population than 2007 census. A comparative population trend of the state *vis-a-vis* the country is given in the table 1.

Though the crossbred cattle strength has increased tremendously (75.92%) but the indigenous cattle strength has gone down with a negative growth of -17.66% as compared to last census which alarms the conservation of important breeds for the time to come. Besides, negative growth rates are also encountered for other species of livestock *viz.* sheep (-39.70%), goat (-20.18%) and pigs (-5.18%). Out of 729.20 millions poultry in the country, the state contributes 5.87%, better than the neighbouring states like Punjab and Rajasthan (Fig. 1) and **there is a surprising growth (48.76%) in this sector over the last census indicating a more inclination in the poultry farming by the state farmers.**

As far as productivity is concerned, the total annual milk production in the year 2013-14 has reached 74.42 lakh tonne and the per capita per day availability of milk (grams) in the state has increased to 773, next to Punjab (961) and much higher to the national average (299g/day). Average daily milk production per animal in milk for crossbred cattle, indigenous cattle and buffalo in Haryana is 8.7, 5.07 and 7.35 kg, respectively, which is much higher than the national average of 7.02, 2.36 and 4.80 kg for crossbred, indigenous cattle and buffalo, respectively. The productivity of the Haryana milch animals stood next best to Punjab than other adjoining states (Table 2). The annual growth rate in milk production in the country has decreased from 4.97% in 2011-12 to 3.54% in 2012-13 while the same value for

Haryana in 2012-13 was 5.7% which is even more as compared to Punjab (1.8%), Rajasthan (3.2%) and Uttar Pradesh (3.4%).

Out of 69.73 billion numbers of egg production in the country, the state shares 6.1%, holding 5th rank next to Andhra Pradesh, Tamil Nadu, West Bengal and Maharashtra and stood 4th in per capita egg availability (168 numbers) which is more than the national average (58 numbers) during 2012-2013.

Towards the total national meat (5.9 million tonnes), Haryana contributes significantly (5.8%) and even a better performer than the neighbouring state Punjab (3.6%). As regarding production of meat from poultry, Haryana stands 4th (0.33 million tonnes) in India.

Annual wool growth rate for Haryana during 2012-13 is 2.8% and very close to the national average (2.95%). Out of total wool produced (46.1 million kg), 3% share is from the state, thus occupying 9th position.

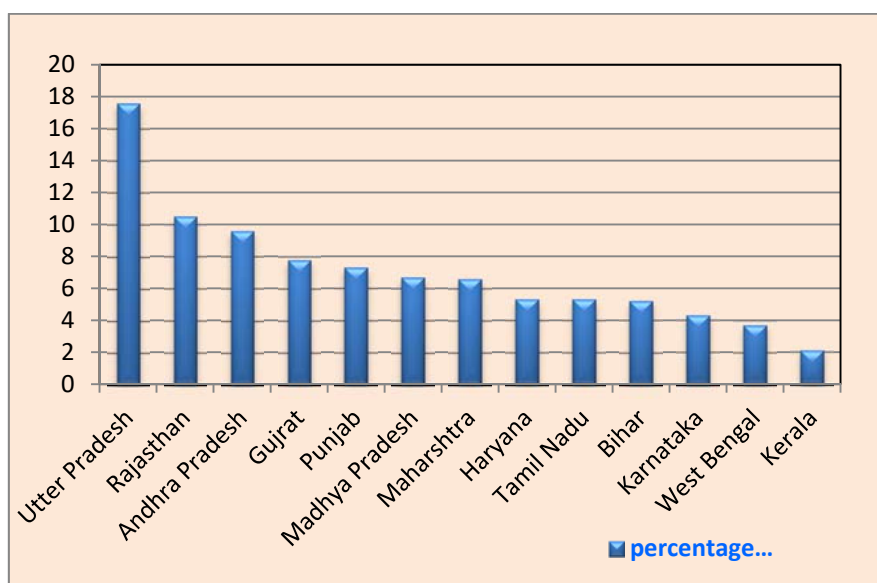


Figure: 1 Share of milk production by different States towards total milk

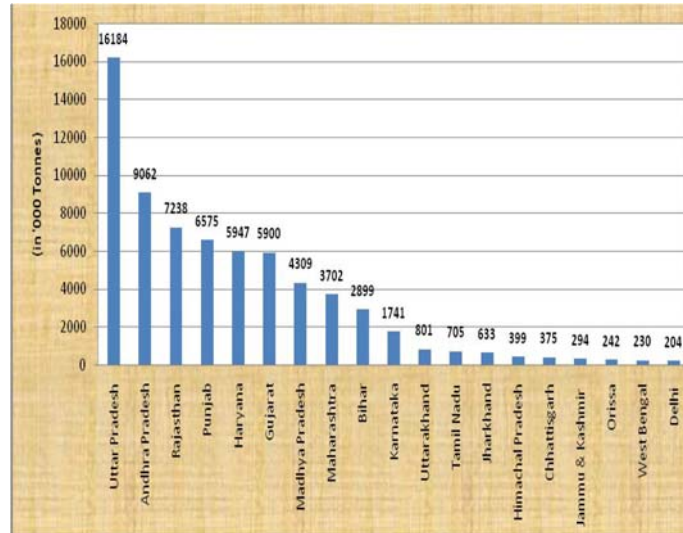


Figure: 2 Buffalo milk (in '000 tonnes) in different States

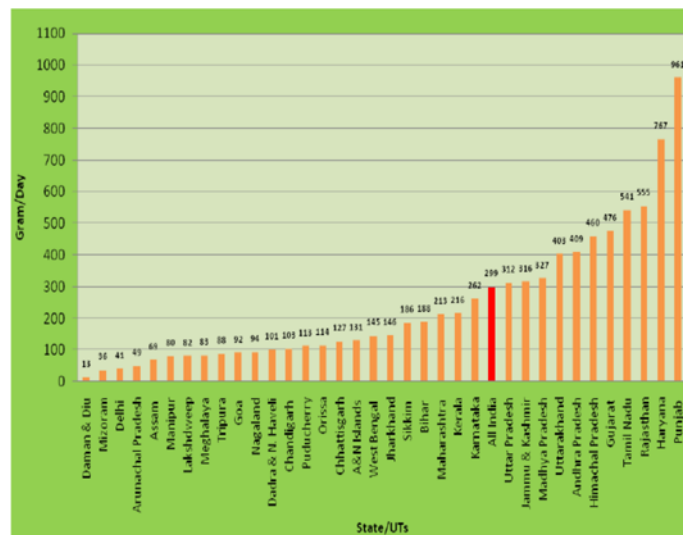


Figure: 3 Per capita availability of milk during 2012-2013

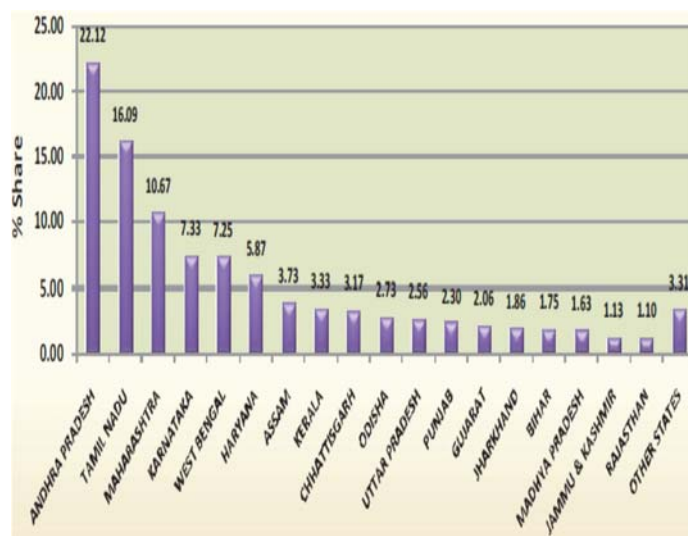


Figure: 4 Percentage share of poultry population by different States

Table 1. Livestock population (million no.)- Haryana vis-a-vis India

| Species | India | | | Haryana | | |
|-------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|---------------------------|
| | 2007 Livestock Census | 2012 Livestock Census | Growth rate (%) over 2007 | 2007 Livestock Census | 2012 Livestock Census | Growth rate (%) over 2007 |
| Buffalo | 105.34 | 108.70 | 3.19 | 5.95 | 6.08 | 2.22 |
| Indigenous cattle | 166.01 | 151.17 | -8.94 | 0.98 | 0.81 | -17.66 |
| Crossbred cattle | 33.06 | 39.73 | 20.18 | 0.56 | 0.99 | 75.92 |
| Total cattle | 199.07 | 190.90 | -4.10 | 1.55 | 1.80 | 16.38 |
| Goat | 140.53 | 135.17 | -3.82 | 0.538 | 0.369 | -20.18 |
| Sheep | 71.55 | 65.06 | -9.07 | 0.601 | 0.362 | -39.70 |
| Horses and Ponies | 0.612 | 0.625 | 2.12 | 0.025 | 0.036 | 41.92 |
| Mules | 0.137 | 0.196 | 43.07 | 0.01 | 0.009 | -15 |
| Donkeys | 0.438 | 0.319 | -27.17 | 0.0048 | 0.0029 | -40.08 |
| Camel | 0.517 | 0.400 | -22.63 | 0.038 | 0.018 | -51.17 |
| Pigs | 11.13 | 10.29 | -7.54 | 0.134 | 0.127 | -5.18 |
| Poultry | 648.82 | 729.20 | 12.39 | 28.78 | 42.82 | 48.76 |

Table 2. Present status of Livestock sector in Haryana and adjoining States

| Sr. No. | Parameters | Haryana | Punjab | Rajasthan | Himachal Pradesh | Uttar Pradesh |
|--|---|---------|--------|-----------|------------------|---------------|
| 1. | Total Livestock (millions) | 9.81 | 8.11 | 57.73 | 4.84 | 68.71 |
| 2. | Total poultry (millions) | 42.82 | 16.79 | 8.02 | 1.10 | 18.66 |
| 3. | Share of milk production (%) | 5.3 | 7.3 | 10.5 | 0.9 | 17.6 |
| 4. | Per capita milk availability (g/day) | 767 | 961 | 555 | 460 | 312 |
| Avg. Daily milk production per animal in milk (kg) | | | | | | |
| 5. | A Exotic/cross Bred | 8.17 | 11.00 | 7.67 | 4.68 | 7.08 |
| | B Indigenous Cow | 5.07 | 6.52 | 3.67 | 1.62 | 2.57 |
| | C Buffalo | 7.35 | 8.64 | 5.62 | 3.56 | 4.44 |
| 6. | Share of meat production (%) | 5.8 | 3.6 | 2.6 | 0.067 | 19.1 |
| 7. | Share of wool production (%) | 3.0 | 1.2 | 30.4 | 3.6 | 3.2 |
| 8. | Share of egg production (%) | 6.1 | 5.4 | 1.5 | 0.15 | 2.4 |
| 9. | Per capita egg availability (no./annum) | 168 | 137 | 15 | 16 | 8 |

LALA LAJPAT RAI UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES, HISAR

Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar, was established in 2010 and is amongst the leading Veterinary Universities in the country, engaged in Veterinary education, research and extension activities. The College of Veterinary Sciences (COVS), earlier the constituent college of Chaudhary Charan Singh Haryana Agricultural University, Hisar has been incorporated in this University since its establishment. The COVS has a glorious history of more than 60 years in India, initially established in 1882 at Lahore (Pakistan) and later the faculty and students shifted to Hisar in 1948. The college is backed by an enviable track record of academic excellence, cutting edge research and rendering quality services to the livestock of the state. An extensive network of alumni occupying important positions throughout the world is a source of inspiration, enthusiasm and commitment to hard work for the faculty and students.

Objectives

The major objectives of the University are:

- i. To impart education in different branches of veterinary, animal sciences, fishery sciences and allied sciences, as it may determine from time to time.
- ii. To further advancement in learning and research in Veterinary, animal sciences, fishery sciences and other allied sciences and to undertake extension of such specialized knowledge to the needy people.
- iii. To undertake study in marketing strategies of live-stock and live-stock products, conservation of live-stock breeds and wild animals.
- iv. To liaise and establish vital linkage with the concerned departments of Animal Husbandry, Fisheries and Dairy Development of the State Government and Union Government, National and International Research Institutes specialized in the field of Veterinary, animal sciences, fishery sciences and allied sciences with a view to keep abreast of the latest technology.
- v. To raise level of Veterinary study to international standards.

SWOT Analysis of LUVAS

Strengths

- i. History and legacy: One of the constituent College i.e. College of Veterinary Sciences inherits a golden history and legacy of academic excellence. The college is an offshoot of Lahore Veterinary College that was established in 1982 at Lahore in greater undivided India.
- ii. Infrastructure and resources: The University has excellent research and infrastructural facilities like animal farms, well equipped laboratories, disease free small animal house etc. The laboratories are being continuously improved and updated.
- iii. Human resources: The university has experienced and strong leadership with dedicated team of Officers and faculty.
- iv. Financial resources: Besides adequate funding from the state, the university is in receipt of funds from ICAR and other central funding agencies. Income is also being generated by various departments through self finance schemes.
- v. I.T. infrastructure: The University has been assured financial support for NKN by the Ministry of HRD to ensure connectivity, access and usage facilities to internet based service, to improve IT-infrastructure and to strengthen e-Library. E-Governance implementation, to ensure paper free smart administrative work, is on its way.
- vi. National/International standing: The University is recognized as an Institution of Academic Excellence as is evident from its collaboration with the Pirbright Institute, U.K.; Royal Dick Veterinary College, U.K.; IVRI, Izatnagar; DIHAR (DRDO); NRCE, Hisar and GJUS& T, Hisar.

Weaknesses

- i. The university is presently sharing the space and central facilities with CCS Haryana Agriculture University, Hisar
- ii. Various central posts related to administrative and ministerial staff for the University's Central Offices are yet to be created by the State Government.

Opportunities

- i. Dependence of farmers for livelihood security: The farmers of the state in general are dependent on livestock farming for their livelihood security. Therefore, the demand for skilled manpower and technology in this sector will be the need of the hour.

- ii. Proximity to National Capital Region (NCR): There is a wide gap between supply and demands for livestock products. Due to close proximity with NCR, the LUVAS can bridge this gap by improving the genetic potential and production potential of livestock in the state to cater to the demands of the NCR.
- iii. Threats like emerging and re-emerging disease: With increasing world population and frequent movements within and across the continents, the threats of newer infections such as avian flu, other emerging and re-emerging diseases pose a significant challenge to public health. The university would strive hard to develop quick and reliable diagnostic methods for diagnosis of such diseases by establishing BSL-III facilities.
- iv. I.T. enabled solutions: With advent of ICT, the communication gap between the scientists and farmers has narrowed down significantly. Potential of IT in providing solutions to the farmers will be exploited to the maximum.
- v. Go-Samvardhan: In view of Govt. policies for conservation and upgradation of indigenous breeds of cattle, LUVAS can synergise efforts in this direction.
- vi. Food safety and standards: Accredited Food safety laboratory will assist LUVAS to enhance the quality and reliability of livestock products in domestic and international market.
- vii. Rural women empowerment: Most of the activities related to animal husbandry, animal management and livestock products processing are being undertaken by rural women in the state. Creating awareness among them for better husbandry and production practices and value addition of livestock products through short term trainings by LUVAS would improve the productivity of animals.

Threats

- i. Erosion of the autonomous status of the university over the recent years and needs to be mitigated by the ICAR and UGC (MHRD).

MAJOR ACCOMPLISHMENTS OF LUVAS

Education

The University offers a 4.5 years Bachelor degree programme (B.V.Sc. & A.H.) in Veterinary Sciences and Animal Husbandry with compulsory 6-months internship; Master and Ph.D. programmes in 18 disciplines of Veterinary and Animal Sciences; 2-year diploma

in Veterinary and Livestock Development (VLDD), and 1-year diploma in Veterinary Laboratory Technician (DVLT) and diploma in Dairy Technology (DIDT).

This University has an unique facility of Disease Free Small Animal House for catering to the demand of laboratory animals for research and teaching of not only of various departments of this university but also of various research and teaching institutes of Haryana and neighbouring States viz., Rajasthan, Punjab, Delhi, UP, Gujarat, Maharashtra, etc.

The University plans and is confident to grow by adding other allied faculties viz. Fisheries, Dairy Science Technology, Animal Biotechnology, Livestock & Rural Management in a phased manner. It intends to establish a state-of-the-art super speciality diagnostic laboratory-cum-epidemiological centre with BSL-3 facilities to monitor emerging and re-emerging diseases. The university is also planning to establish Instructional Livestock Farm Complex (ILFC), Institute of Laboratory Animal Sciences, Central Animal House Facility and Post-mortem Centre with state-of-the-art facilities. The University is working with the line departments for active co-operation and collaboration for quick transmission of technology from laboratory to end users and strengthen extension services.

Research

1. Disease diagnosis, surveillance, monitoring and treatment

- The LUVAS has outstanding contributions to Foot and Mouth Disease control programme in Haryana State. The Regional Research Centre on FMD, Hisar has received best performance award consecutively for four years. Farmers from different villages of Haryana visiting Hisar on the occasion of Pashu Dhan Diwas, Kisan Mela, Farm Darshan, Kisan Diwas are educated for prevention and control of FMD in animals. The visiting farmers are impressed upon the importance of mass FMD vaccination being done free of cost under FMD-Control Programme through Govt. of India.
- The College Central Laboratory provides laboratory diagnostic help mainly related to microbiological work to clients including animal owners, farmers, animal breeders, shepherds, State Semen Banks, State owned or private animal farms, State Animal Husbandry Department and Veterinary Hospitals, Haryana Livestock Development Board, Regional Disease Diagnostic Laboratory (RDDL, Jalandhar), Central Sheep Breeding Farm, Ministry of Agriculture, Govt. of India and private pharmaceutical organization like Ranbaxy, etc. The Laboratory is

mainly dealing with two of the major problems in animals i.e. Brucellosis and Mastitis.

- Teaching Veterinary Clinical Complex (TVCC), College of Veterinary Sciences caters to the needs of clinical teaching, diagnosis, treatment of animals and Veterinary extension through its different units. The TVCC is a premier centre for treatment of animals and serve as a referral Veterinary Clinics for Haryana and neighboring states. During last year, about 10,000 clinical cases of various animal species in clinical medicine, gynaecology, surgery and the pet animal section were provided treatment and 3,000 samples were tested in diagnostic laboratory. Around 500 cases were subjected to diagnostic imaging per month and an income of Rs. 10.5 lacs was generated during 2015-16.
- Recently, in 2014 Regional Centre, LUVAS, Uchani (Karnal) has been established under the able guidance of Worthy Vice-Chancellor by upgrading the Veterinary Unit Substation TVCC. The Regional Centre, Uchani has two well established units namely TVCC and Disease diagnostic laboratory with the objectives to provide diagnostic and treatment facilities for various diseases of domestic animals of eastern Haryana, and to create additional facilities for internship training of B.V.Sc. & A.H. programme.
- Ultrasonography unit and large & small animal X-ray machines in the university are providing diagnostic services for small and large animals. Trainings are being organized on "Ultrasonographic imaging" for the field Veterinarians and faculty members of State Agricultural Universities from time to time.
- The LUVAS is playing a significant role in the diagnosis, prevention and control of emerging/ re-emerging diseases of livestock and poultry and etio-pathological studies of important diseases prevailing in Haryana primarily by employing various diagnostic studies/techniques/examinations like haematological and biochemical testing, post-mortem examination, histo-pathological and biopsy examination, immuno-pathological techniques, toxicological examination, fecal tests, pesticide residue analysis in animal products and food safety analysis, studies of environmental physiology on animals, semen biology, infertility profiling, endocrinology, neem biology, ketosis experimental physiology, draft capacity, mastitis biochemical studies, reproductive biology, equine/bubaline stem

cell research, digestive physiology and bubaline proteomic profile of pregnancy specific protein, genetic polymorphism studies on hsp 70, LHR, LEPR genes, donor cell profiling for embryo cloning and characterization. Semen biology laboratory and Radioisotope laboratory in Animal Sciences premises of the LUVAS are well equipped with latest instruments and audio-visual aids. ICAR recognized the department of Veterinary Microbiology as Centre for Advanced Studies in the year 1995. A state of the art museum is maintained by department of Veterinary Pathology housing gross specimens depicting various disease conditions of different animals.

- A large number of farmers visit department of Veterinary Public Health and Epidemiology daily for disease diagnosis/investigation in poultry flocks, sheep flocks and cattle herds. Outbreaks throughout the state are investigated and control and preventive measures are suggested for their containment. The Disease Investigation Laboratories of the department exist at six districts of the state, where field Veterinarians send samples or farmers bring cases/samples for disease diagnosis for mastitis, fecal examination, blood examination, antibiotic sensitivity testing, poultry disease investigation, outbreak investigation, etc. Facilities are available on nominal charges for bacteriological testing of drinking water and adulteration of milk/synthetic milk/aflatoxin testing in feeds/grains and TB/JD screening of herds.

2. Generation of resources and reagents

- The LUVAS has the only laboratory in India that produces recombinant single domain camel antibody fragments through phage display technology (nano antibodies) having diagnostic and therapeutic applications.
- Developed phage display technology for recombinant antibody fragments against bacterial toxins.
- Developed hybridoma technology for production of monoclonal antibodies against parasite antigens.
- The LUVAS has an unique facility of Disease Free Small Animal House for catering the demand of laboratory animals for research and teaching of various departments of this university as well as various research and teaching institutes of Haryana and neighbouring States. The facility has maintained the same germplasm

since 1974-75 of all five laboratory animals viz., Rabbits (NZW), Rats (Wistar), Mice (Swiss), Guinea pigs (Duncan Hartley) and Hamsters (Syrian Golden).

3. Development of diagnostic tools/technologies

- Monoclonal antibody based assays have been developed for Haemorrhagic Septicemia (HS).
- ELISA Kit for monitoring HS antibodies in serum of cattle and buffaloes.
- Monoclonal antibody-based latex agglutination test (called TE-LAT) for detection of *Trypanosoma evansi* antigen ('surra' infection) in animals.
- Nucleic acid based diagnostic tests (conventional PCR / real time RT-PCR / PCR and LAMP) have been developed at LUVAS for diagnosis of Haemorrhagic Septicemia (HS), Peste des petits ruminants virus (PPRV), Bluetongue virus (BTV), Sheep and goat pox virus (SPV and GPV), Infectious Bovine Rhinotracheitis (IBR), New Castle disease virus (NDV), Marek's disease virus (MDV), Inclusion body hepatitis (IBH).
- The LUVAS provides diagnostic services to State Animal Husbandry Department for diagnosis of BTV and IBRV.
- Developed Animal Forensics tools for cow and buffalo meat identification from raw, cooked & spoiled samples and got patented.
- Developed DIVA test (3A-NSP antigen based ELISA) as per OIE protocol in collaboration with Freidrich Loeffler Institute, Greifswald, Insel Riems, Germany for differentiation of FMD infected and vaccinated animals (DIVA strategy).
- Developed Field Spot Test to Detect Urea in Milk which also got patented.
- The LUVAS developed Protein-G Based Technology and Fluorescence Polarization Assay for Diagnosis of Brucellosis in Buffaloes for diagnosis of Brucellosis in buffaloes (patent application under process).

4. Vaccine development

- Developed a marker vaccine for Haemorrhagic Septicemia.
- Developed novel experimental vaccines against bovine Haemorrhagic Septicemia and bio film forming *Staphylococcus aureus*.
- Developed India's First Inactivated Pentavalent Bluetongue Vaccine for control of Bluetongue Disease.

5. Breeds developed at LUVAS

- A new breed named as “HARDHENU”, synthetic population of crossbreds having 62.5% exotic inheritance, has been developed. The Wet average is 11.32 kg/day/animal. About 45% of cows produced more than 3000 kg of milk during lactation and about 99% of the cows produced more than 2000 kg milk in lactation. Age at first calving is 36 months. Calving interval has been obtained around 12.5 to 13 months during the last 8 years.
- Genetic association between milk production and draft capacity has been worked out for the first time in the country by LUVAS. Data for the study were collected from animal farm of LUVAS (erstwhile CCSHAU), Hisar on 63 animal (33 males + 30 females) progenies of eight sires belonging to two different sets with an aim to evaluate the sires for milk yield and draught-ability. The study conducted by the University gave an indication that these two traits namely Milk and Draft are of antagonistic nature in general.

6. Value added product development

- The LUVAS has developed new Livestock Products and Technologies like Low Cholesterol Burfi, Sugar Free Rasogulla, Low Sodium Chicken Patties and Rolls, Gizzard Pickle, Chicken Cutlets and Pickle, Egg Pickle, Ready to serve Spiced Paneer (at lower cost than the normal paneer) and Paneer pickles (Brine pickle; Spiced Sweet and Sour pickle; Spiced Oil based pickle and Spiced Vinegar pickle) that are available for commercialization.
- ***LUVAS recommendations/technologies developed for Value Added Products***
 - Slow ammonia releasing urea product (Uromalt) developed by the LUVA Scan be used where molasses or other feeding stuffs rich in rapidly fermentable carbohydrates are not available. Uromalt-20 (product of urea and malted barley) can be fed alone as a sole concentrate feed to cattle.
 - To economise the concentrate mixtures of lambs, growing calves, lactating buffalo and lactating cattle the agro-industrial by-products mustard cake or groundnut cake can be replaced with sunflower cake as protein source.
 - Technologies have been developed by LUVAS for production of wholesome fresh meat for consumers.
 - Various ready-to-eat value added meat and chicken products like meat block, salami, kebab, sausages, meat balls, chicken tikka, cutlets, chicken rolls, chicken loaf, and chicken patties have been standardized by our scientists.
 - The LUVAS has developed technologies for low cholesterol dairy products.

- Noodles incorporated with paneer have been developed which contains all essential amino acids.
- Whey, a major by-product of heat and acid coagulated milk products has been utilized for development of whey based coffee and beverages.
- The LUVAS has developed sugar free milk products with artificial sweeteners.
- Technology has been developed to manufacture paneer from cow and buffalo's colostrum that contained almost more than double the protein and mineral content as compared to control paneer.
- Butter with improved spread ability and shelf life of 60 days at refrigeration temperature has been developed.

Extension

The University has a well-structured program for extension education and transfer of technologies related to animal health, production, fisheries and value addition to the end users through its Directorate of Extension Education. The university is determined to put in place a robust, modern and responsive 'Knowledge Support Systems (KSS)' creating not only a bridge between livestock owners and scientists but able to become a very much accessible, responsive and modern 'livestock knowledge exchange'- amongst livestock owners, entrepreneurs, other stakeholders, state government departments and agencies with various organs of the 'Directorate of Extension Education'. The core activities of the Directorate of Extension Education are:

Provision of animal health services as core service at zonal level

For delivery of 'efficient services' at different 'physio-geographic regions' of the state, LUVAS has seven Extension Specialists as per details given in the Directory of the Directorate.

Technological exchange interface with the livestock owners, field functionaries and fine-tuning the research on the basis of exchange

The extension services at the Directorate have been providing an 'Exchange Interface' through **Toll Free Phone** and **Free SMS** services that is becoming a great tool to detect some of the researchable problems faced by the livestock farmers entrepreneurs, extension functionaries and industry and taking the university research and technologies developed by scientists at the farmers' doorstep.

Organizing the Pashu Dhan Diwas at university campus

The Directorate is organizing ‘Pashu Dhan Diwas’ every year since 2012 either on LUVAS foundation day or on Birth Anniversary of Great Freedom Fighter Shri Lala Lajpat Rai Ji. On this day university interacts with the farmers face to face, and displays various new technologies developed by the university.

Organizing dairy training programmes for rural women across Haryana

The LUVAS is continuously organizing training programmes that are really helpful in empowering the rural women of the state by increasing their knowledge about good animal husbandry practices and thereby increasing the earning capacity of the women and ultimately leads to their economic empowerment. Recently, a Mahila Sammelan on “Women Empowerment through Animal Husbandry” was organized at LUVAS in which more than 800 rural women and the progressive ladies working in area of livestock entrepreneurship from different parts of Haryana participated.

Organization of different training programmes

The Directorate of Extension Education as well as different departments and Disease Investigation Laboratories of the university are continuously organizing various workshops/clinical camps/pashupalak goshties and trainings on “Commercial Dairy Farming”, “Importance of balanced ration and mineral mixture in Animal Husbandry”, “Milk and Milk Processing Technology”, Vocational dairy training at D.I. Laboratory, Animal Husbandry Officers workshop, training on “Meat and Meat Products Technology”, CAFT trainings organized by Department of Veterinary Microbiology, training on different molecular aspects and molecular diagnosis of livestock/poultry diseases organized by department of Animal Biotechnology, training on post-mortem examination and collection & dispatch of specimens organized by department of Veterinary Pathology. These training programmes are organized for the farmers/livestock and poultry owners, SC/ST candidates, students, field veterinarians and faculty of different institutes.

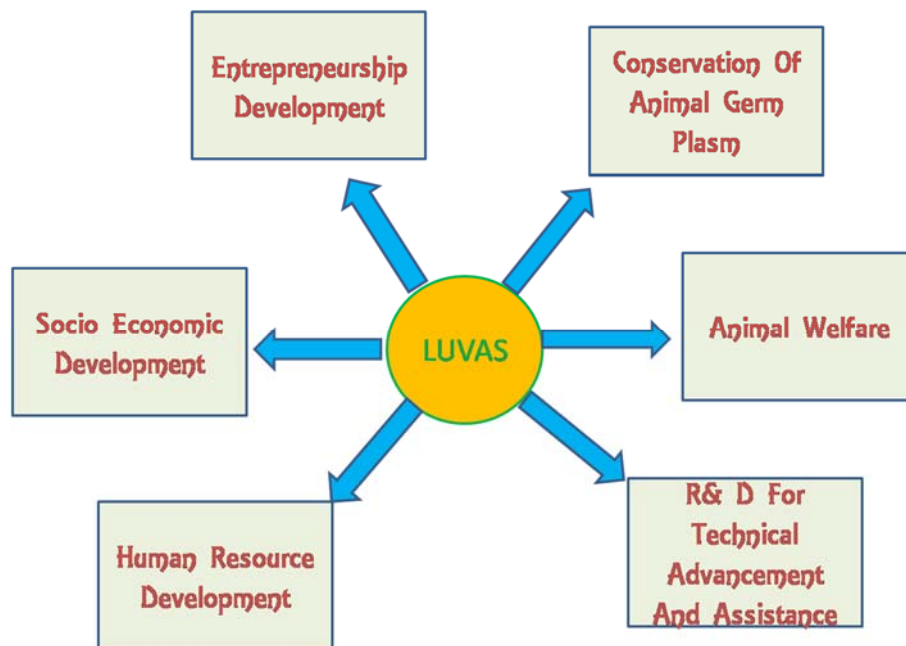
Clinical camps & other field campaigns

Organization of clinical camps, different kind of campaigns and special activity ‘Weeks’ in different areas of the state is an important activity which the Directorate has to undertake in a more robust fashion. Organization of Animal Welfare Camps/field days with the participation of the farmers, experts from the University, livestock related industries

(pharmaceuticals, feeds, equipments, value added animal products, germplasm, etc.); livestock development and financial organizations mainly banks, could be a very effective medium for making closer connections between extension system with the Extension Education speciality of the University.

Vision and Strategic Framework 2030

“It is through vision that innovation is conceived; through will power it is then materialized.” -Wayne Chirisa



Human Resource Development and Academics

The education at the University is focused at interactive learning processes to improve knowledge, skills and technical expertise of the students. Continuous improvement in education quality is at priority for the University. Teaching and training youth for entrepreneurship development is one of the key areas for the University.

- Imparting international standards in current veterinary and animal sciences education system
- School of Laboratory Animal Medicine will be established.
- Colleges of Fishery Sciences and Rural Management will be opened.

Versatile technologies would be developed to strengthen:

- Diagnostic and therapeutic services for various animal diseases prevalent in the region.
- Research on surgical operative techniques, treatment of infertility cases in dairy animals as well as establish the stem cell therapy for treatment of joint illness & healing of wounds.
- Epidemiological studies on skin diseases in companion animals as well as diagnosis and management of dermatological disorders.

Establishment of College of Dairy Sciences and Technology

The College of Dairy Science and Technology (CODST) will move forward in a missionary mode to take the challenges in dairy development so as to ensure optimum returns to dairy farmers in the dairy value chain.

Vision

To ensure livelihood and profitability to the producer and availability of quality milk to the dairy industry for quality dairy products production through adoption of appropriate technologies to meet out quality milk products demand of consumers at affordable cost.

Mission

Development of highly professional dairy specialists through value based education, research and training in dairy science and technology for meeting technological and societal needs of the state as well as nation.

Mandate

- i. To organize teaching programmes at undergraduate and postgraduate levels for human resource development for the dairying sector.

- ii. To undertake research in new areas of milk processing technologies through application of new processes.
- iii. To formulate package of practices in the area of milk processing technologies to disseminate scientific knowledge to the end users.
- iv. To organize training programmes for dairy farmers for socioeconomic transformations, entrepreneurs, dairy industries, vocational courses and specialized training programmes.
- v. To provide consultancy services to dairy industry, dairy development agencies and other dairy research organizations.
- vi. To maintain liaison with the state and national/international organizations related to dairy development

Focus

- i. Teaching
 - ii. To accomplish the vision, mission and mandate of the CODST, the three tier dairy educational system would be adopted.
 - iii. Certificate courses/ specialized courses
 - iv. Indigenous Milk Products
 - v. Value Added Dairy Products
 - vi. Dairy Laboratory techniques
 - vii. Dairy Plant Operation and Maintenance
 - viii. Dairy Business Management
- The certificate courses under vocational programmes will be offered for the entrepreneurs willing to establish small scale milk processing units. Specialized courses will be offered to in-service trainees from the respective departments, milk producers and processing plants depending upon the specific requirements of the organizations in the public and private sector.
 - Diploma level courses in
 - Dairy Technology
 - Dairy Engineering
 - Dairy Quality Assurance/RegulationThe college will offer these diploma courses in the coming years.
 - Graduate and post-graduate programmes in Dairy Science and Technology: The College would offer undergraduate and post graduate programmes in Dairy Science and Technology to strengthen higher dairy education human resources and capacity building for R&D institutes in dairying in the country.

Establishment of College of Fishery Sciences

To cater the needs of fast developing fisheries sector, the College of Fishery Sciences (COFS) will be established at LUVAS, Hisar. The College will be having highly competent and experienced faculty and well equipped to undertake teaching, research and training in fisheries for producing professionally and technically qualified manpower. At COFS, the following programmes of study will be offered:

- B.F.Sc.
- M.F.Sc. (Aquaculture, Fishery Biology and Fisheries Resource Management)
- Ph.D. (Aquaculture, Fishery Biology and Fisheries Resource Management)

The curriculum of B.F.Sc. (four year degree programme, divided into eight semesters) will be based on the recommendations of ICAR. During the first six semesters, courses (theory and practical) will be offered. During seventh and eighth semester students shall undergo Experiential Learning/Hands on training and In-Plant training, respectively.

The curriculum of M.F.Sc and Ph.D will also be based on ICAR recommendations comprising of four and six semesters, respectively including theory and practical Project/thesis as an integral part of both the programmes. The successful completion of B.F.Sc. and M.F.Sc. would entitle the graduates and the postgraduates for better job opportunities in India (State Fisheries Department, Universities, Fisheries Institute and private fisheries sector/industry) and abroad.

Mandate and Goals

- i. Human Resource Development in Fisheries
- ii. Basic, applied and adaptive research on emerging problems in fisheries
- iii. Transfer of technology to fish farmers, entrepreneurs and industry
- iv. Fish production and productivity enhancement

Facilities

- i. Lecture/seminar rooms well equipped with audio visual aids for quality teaching and training
- ii. UG/PG laboratories well equipped with high-tech facilities for quality research
- iii. Adequate farm facilities for teaching, research and trainings/demonstration
- iv. Farm Facilities including Instructional Fish Farm, Fish Seed Hatchery, Ponds (Nursery Ponds, Rearing Ponds, Stock Ponds, Brood Ponds), Cat Fish Research

Complex, Integrated Fish-Livestock Unit, Integrated Fish-Duck Unit and Culture Complex for indigenous sub-temperate fish farming

Research

Animal Production

The LUVAS is engaged in scientific research and studies on various aspects of animal husbandry and dairy sciences with proven impact on animal welfare in the state. Animal production, productivity enhancement addressing climate change issue, value added product marketing and improved animal feeding practices to lower down feed wastages will be the key research areas in times to come. The technical advancement in livestock production and management through extensive research and adaption of integrative approaches in frontier areas will be key research area. Keeping this in view, the Vision 2030 of LUVAS has been designed with commitment to the society for Animal Production.

Conservation and Characterization of Indigenous Breeds of Livestock & Poultry

Haryana is gifted with vast animal genetic resources. Haryana is well known for Murrha buffalo, famous for high productivity and also native for Haryana breed of cattle. Conservation of such elite indigenous breeds is need of the hour. Research priorities will be set for genetic characterization of prestigious indigenous breeds and for the identification of pure bred animals. Open Nucleus Breeding System will be used for the production of bulls using latest biotechnological/ reproductive technologies. Cutting age technologies like stem cell technology and animal cloning will be adopted for conservation and productivity improvement of buffaloes and other livestock species.

Development of new Breeds/ Strain of Livestock and Poultry

- Genetic improvement of Murrah buffaloes shall be further augmented through intensive progeny testing of bulls using field and farm records.
- New genotypes of dairy cattle (Hardhenu), carpet wool sheep (Harnali) and a layer strain of chicken (Harley) through crossing & selection and testing of these genotypes under field conditions will be evolved.
- New breeds/ strains of goat and sheep for raising under stall-fed conditions will be developed.
- Dual purpose (egg and meat) chicken strain by crossing and selection providing protein security as well as income to the rural households will be developed.

Genetic Database on Whole Genome Sequence of Murrah buffalo to develop markers for characterization of breeds, prolificacy, fecundity and disease resistance

- Whole genome sequencing project on buffalo breeds especially Murrah to establish genetic database
- Development of markers for characterization of breeds, prolificacy, fecundity and disease resistance
- Functional genomics and proteomics approach for determining the relative expression of different genes in various diseases
- Whole genome sequencing database for economically important livestock and poultry viruses for development of diagnostics and vaccines

Establishment of Biometrical and Animal Genomics Laboratory with the aim of

- Integration of quantitative and molecular techniques for livestock improvement
- Analysis of field progeny testing data for evaluation of bulls and for conducting research on genetic evaluation methods gradually supplementing the traditional progeny testing programs
- Integration of the traditional and genomic selection methodologies for faster rates of genetic progress

Breeding Strategies for Economical Traits

- Optimal selection criteria for simultaneous improvement in production and fertility
- Genetic studies on coat colour, behavioural and intelligence traits in companion animals and birds
- Genetic studies on optimization of selection criteria for the improvement in performance traits of aquatic germplasm

Strategic Nutromic Interventions

- Redefine the nutritional requirements for all species of ruminants & non-ruminants to ensure their health & production.
- Devise strategies for effective utilization of available feed resources through strategic supplementation of critical nutrients to enhance rumen fermentation but reduce methane production, use of essential and non essential feed additives and implementing phase feeding to economize animal production.
- Carry out work on efficient utilization of cereal straws or by-products from sugar cane, fruits and vegetables as well as by-products from food processing, oil industry, breweries, by-products from bio fuel besides identification and detoxification of anti nutritional factors.
- Development of low cost and simple feed processing technologies to improve nutrient utilization
- To formulate and manufacture of regional need-based quality mineral mixtures, strategic supplementation of limiting macro and micro nutrients, probiotics/prebiotics, feed additives (enzymes, methane inhibitors etc.), development of

Total Mixed Ration technology for improving efficiency of ruminant digestion, nutrition-reproduction interaction assessment with special reference to feeding of transition and sick animals would be considered both for current and future applications

- Evaluation of genetically modified feeds and forages entering into food chain.

Establishment of an accredited feed analysis and safety laboratory

Value addition of animal products

- Development of value added cholesterol free, low fat and fibre enriched meat and milk products
- Development of technologies to utilize agro industry waste for higher economic returns to food processors in terms of waste utilization
- Development of shelf stable Meat and Milk Products

Strengthening Physiological and climate changes studies

For better understanding the effect of climate changes on animal behaviour, reproduction and productivity, the following laboratories will be established

- Digestive Physiology Laboratory for work on rumen eco-system and improved feed utilization
- Physiogenomic Laboratory to improve the production, reproduction, fertility, growth, nutritional efficiency and other attributes vital to the economy of the producers
- Proteomics Laboratory for identification of new biomarkers and therapeutic targets for the diagnosis and treatment of different diseases
- Reproductive Physiology laboratory for development of technologies for sex Sorting of Semen, cryopreservation of buffalo bull semen and endocrine regulation of reproduction

Animal Health

Improving animal health through development of technologies for rapid disease diagnosis, treatment and prophylactic strategy planning is one of the priority areas of LUVAS which can improve the economics of livestock farmer. The university has broad planning for establishment of various frontier areas of animal health and veterinary practices.

Achieving Excellence through clinical services:

Establishment of cutting age clinical complex

The clinical complex of LUVAS has been in service of society for many decades with extra ordinary performance in Surgical and Gynaecological treatments. The departments like Veterinary Surgery and Radiology, Veterinary Medicine and Veterinary Gynaecology & Obstetrics are strong pillars of clinical research of the university. The university has strong

vision for establishment of Diagnostic Imaging laboratory for diagnostic imaging techniques viz. digital radiography, ultrasonography, CT scan, image intensifying system (C-arm) and Ophthalmological and Dentistry Unit for early diagnosis and timely treatment of affections of these systems.

The Department of Veterinary Medicine envisages establishing independent sub-sections viz. ruminant, equine, pet animal, wild life, forensic medicine and animal welfare for effectively tackling these species/issues with specialized and trained manpower. Creation of innovative Research and Diagnostic facilities for important metabolic disorders, mineral deficiencies, mastitis, hemoprotozoan diseases of large animals, and hormonal diseases of dogs is also priority area of the department.

Providing Therapeutic Services

For many years TVCC is acting as referral veterinary polyclinic in collaboration with various departments of the LUVAS. TVCC provides broad vision for

- Research on surgical operative techniques, treatment of infertility cases in dairy animals as well as to establish the stem cell therapy for treatment of joint illness & healing of wounds

Animal Reproduction

- Establishment of Reproductive Physiology laboratory for development of technologies like sperm sexing, cryopreservation of buffalo bull semen and endocrine regulation of reproduction
- Development of Ultrasonography based technologies for an imaging technique in the diagnosis of early pregnancy and various reproductive disorders in domestic and pet animals. Three dimensional ultrasonographic technologies will also be developed for studies on male and female animals to generate basic research data.
- Development of techniques for timely detection and management of anoestrus and repeat breeding, the two major infertility problems, will be focussed.
- Contraceptive measures for the population control of stray animals will be developed.

Animal Disease Diagnosis

Development of state-of-art disease diagnostic laboratories for animal disease diagnosis and surveillance is important for disease management of emerging and re-emerging diseases of economic and zoonotic importance. The well reputed laboratories of LUVAS will be further updated and upgraded for their improved competence both in terms of valued human resource development and technological advancements.

Establishment of National and International Referral Diagnostic Laboratories for diseases caused by new, emerging and re-emerging pathogens

- Rapid and effective diagnostic tools for detection and control of infectious diseases in diagnostic referral laboratories with BSL-2 & 3 facilities with capacity to handle majority of pathogens under 'One World One Health' concept.
- Upgradation to meet out international standards - having a battery of specific and sensitive diagnostic tests to be used for quick diagnosis in the event of outbreak.
- Control programme of economically important diseases will be initiated in a coordinated manner for disease control/eradication.

Establishment of Vector Borne Disease network at National and International level

- Currently an Indo-UK project entitled "*Monitoring and intervention strategies for bluetongue virus epidemics in rural India*" is operating in the department of Animal Biotechnology for monitoring and intervention strategies for control of the disease with a special reference to the vectors.
- Study of the vector biology, movement and climate suitable for vectors for designing the low cost methods in effective control of these vectors as well as predicting the BTV epidemics.

Up-gradation of National Typing Centre on Bluetongue into International Typing Facility for SAARC Countries

- Upgradation of 'National Typing Centre on Bluetongue', All India Network Project on Bluetongue (ICAR) through the use of molecular techniques and new generation sequencing technologies to '*International Typing Facility on Bluetongue for SAARC Countries*'.

Genetic Database on Whole Genome Sequence for economically important livestock and poultry viruses aimed with development of diagnostics and vaccines

- Nucleic acid based diagnostic kits for rapid, sensitive and cost effective diagnosis of different emerging and re-emerging animal and poultry diseases
- Novel vectors for gene and drug delivery for animal and poultry health improvement
- DNA based forensics tools will be developed for identification of domestic and wild animal species using reminiscent biological samples
- Novel vaccine technology using nano-virus particles, reverse genetics, codon optimization, synthetic virus generating tools, etc. against economically important diseases of livestock and poultry

Establishment of Modern laboratories

- Modern laboratories having biosafety levels BSL-3/4 and infrastructure (including equipments & bioinformatics tools for state-of-the-art R&D) for research will be developed having facilities for bacteriology, virology and immunology, toxicopathology, immunopathology and molecular pathology. Facilities for confocal microscopy would be established to initiate work on molecular immunopathology.
- A state-of-the-art Toxicological Laboratory having facilities for studies on

- Biochemical, developmental and reproductive toxicity, immunotoxicity and genotoxicity,
 - Assessment of neurotoxic potential of commonly used newer pesticides, and
 - Establishment of age and gender related differences
- Establishment of repositories of veterinary pathogens isolated and received in the department

Establishment of Centre of Excellence for Parasitic Disease Surveillance and Diagnosis for

- Surveillance of major haemoprotozoans (viz. trypanosomosis, theileriosis and babesiosis), helminthic (viz. fasciolosis, amphistomosis, nematodosis, hydatidosis and cysticercosis) and arthropod (viz. myiasis, tick infestation and mange) diseases prevalent in the state
- Monitoring of anthelmintic and acaricide drugs to detect anti-parasitic drug resistance, if any
- Modern immunodiagnostic techniques involving molecular and biotechnological based tools for important parasitic diseases

Establishment of geo-informatics unit to create veterinary geo-database on livestock & poultry resources for

- Epidemiology of diseases for predictive purposes through geographic information system (GIS), remote sensing and spatial statistics
- Generation of veterinary geo-database on livestock and poultry resources, facilities and infrastructure as well as on diseases and production constraints
- Mapping, spatial analysis and prediction of major livestock diseases to formulate control strategies

Disease containment strategies

The research priorities have been especially targeted towards two economically important diseases of domestic animals in the state viz.: Foot-and-Mouth Disease (FMD) and Hemorrhagic Septicemia (HS), besides PPR and brucellosis.

FMD Control Programme

The Regional Research Centre on FMD (RRC on FMD) is involved in implementation of FMD-Control Program (FMD-CP) through surveillance and sero-monitoring work in all the 21 districts of Haryana and Delhi. **The incidence of FMD outbreaks has come down very low since 2004** after launch of FMD-CP through mass vaccination of animals by the Department of Animal Husbandry & Dairying, Govt. of Haryana. The Haryana state has emerged as a *“model state for the success of FMD-Control Programme”*. The Centre envisages to undertake the following:

- Research work on FMD to achieve '*Progressive Control Pathway - Stage 4*' as proposed by OIE-FAO
- Employ molecular diagnostic tests to speed up diagnosis of FMD
- Improved test for DIVA strategies viz. latex agglutination test (Pen-side DIVA test) for field application and 'florescence polarization assay'
- The above technologies will lead towards making Haryana FMD-free and ultimately initiate steps to eradicate the disease from India

Bovine Hemorrhagic Septicemia: Diagnosis and Control

- Control and eradication of HS is urgently required to enhance the country's milk production
- Development of **Improved diagnostic tests** for fast and accurate diagnosis of the disease and differentiation from other diseases
- Regular isolation, molecular characterization and their anti-biograms will be done to guide animal husbandry officials about suitability of the treatment
- Development of Microarray based molecular laboratory tests for diagnosis of HS
- **Improved HS vaccine and monitoring of vaccination program:** Marker HS vaccine for DIVA strategy for effective implementation of disease control
- Correlates of protection of cattle and buffaloes against clinical disease shall be established for reliable testing of vaccine potency & efficacy
- Role of various vaccinal antigens in total protection

Epidemiology of Zoonotic diseases and Public health

The department of Veterinary Public Health & Epidemiology (VPHE) is providing diagnostic services for diseases of livestock and poultry to farmers and also deals with safety of foods of animal origin as well as zoonotic diseases. Besides teaching, the department is providing diagnostic services to farmers through Disease Investigation Laboratories located at six places in Haryana, at Ambala, Bhiwani, Jind, Mahendergarh, Rohtak and Sirsa and one laboratory at the LUVAS Campus. Every day about 60-100 farmers visit these laboratories for diagnosis and advice. Department is also providing facilities for bacteriological analysis of drinking water for humans and animals and earning around 6-7 lacs per year from these services. Many laboratories have recently been renovated through grant from RKVY and upgraded with equipments.

In coming years, it is proposed to further widen the scope of services and activities of the department and upgrade it into an Institute of Veterinary Epidemiology and Public Health having three major sections:

- A. Veterinary Public Health and Food Safety
- B. Veterinary Epidemiology and Disease Informatics
- C. Centralized Equipment Facility

A. Veterinary Public Health and Food Safety

Accredited Food safety and Quality Testing Laboratory for Foods of Animal Origin

FSS Act, 2006, which has come into force from 5th August, 2011 will require setting up of large number of Food Testing Laboratories including for foods of animal origin. There is shortage of technical manpower for certification and auditing in India. Creating and facilitating strong working relationships among food system professionals and organizations, government entities and academician will be one of the core activities of LUVAS.

It is proposed to establish an accredited international laboratory dedicated to foods of animal origin to meet all referral needs during implementation of FSS Act, 2006 and to meet the food testing requirements for exports through new and latest test methodologies, technologies and materials, etc., as per norms of different countries and our own country.

Zoonosis and one health sub-section

During the past 20 years, large number of diseases from animals have crossed over to humans and caused lot of deaths world over. Hence, in this emerging area of one health, close interaction with medical professionals' and allied subjects will be undertaken to carry out teaching courses/research and control measures for such diseases.

Environmental Hygiene and Climatic Change Sub-Section

This section will focus on water borne diseases, impact of climate change on emergence of new diseases in man and animals, provide services for water testing for human and animal health point of view including microbiological, physical and chemical tests.

B. Veterinary Epidemiology and Disease Informatics Section

This section will provide services to stake holders/livestock farmers/breeders/poultry farmers, train veterinarians and manpower in the field of epidemiology, disease investigation, economics of herd health, disease modeling and forecasting, collection of data and samples to find out prevalence of various diseases in livestock and poultry through a continuous surveillance system.

C. Centralized Equipment Facility

The state-of-the-art centralized equipment diagnostic facility is not only necessary for animal health but also for human health under “One World, One Health” concept. The centralized facility aims to address the issue of control of diseases and infections through timely and accurate diagnosis. It also aims to train highly skilled manpower in the field of disease diagnosis. The facility would have the following mandate:

- Timely and accurate disease diagnosis
- Establishing National/ OIE/FAO Referral Laboratories of diseases important to state of Haryana and India
- Train human resource in the area of animal disease diagnosis through post graduate research program and diploma courses
- Research and development in the area of disease diagnosis with the aim to: a. Continual skill improvement, b. Self-sufficiency on inputs of laboratory i.e. antigens, antisera, kits and various other bio-reagents for disease diagnosis. Make available trained manpower in the area of disease diagnosis and diagnostics for self employment as well as for industry.

This is achievable by establishing an accredited disease diagnosis laboratory. An **ISO/IES: 17025** accreditation is internationally accepted standard for testing laboratories, which will increase our export potential and the laboratory will be one of its kind in the region and self sufficient to meet out its running cost in future.

Regional Centres/ D.I. Labs at outstations

At present specialized veterinary services including X-rays, surgical operations, gynecological operations and diagnostic laboratory facilities are available either at TVCC, Hisar or at TVCC substation Uchani, Karnal. These clinical complexes are providing services to more than 20,000 and 15,000 livestock owners per year at Hisar and Karnal, respectively. The services provided by TVCC substation Uchani, Karnal have been publically applauded by farmers and other stake holders at different platforms. In addition seven Disease Investigation Labs (DI Labs) of LUVAS are providing diagnostic services to more than 3,500 poultry and 12,000 livestock farmers every year. It is proposed to provide such facilities to the farmers in other parts of Haryana, thus saving millions of rupees to the farmers and usher in extensive animal husbandry activities in the progressive state of Haryana.

There is an urgent need of regional disease diagnostic laboratory at each divisional level as well as referral centres for early accurate detection of diseases and to take corrective measures without any loss of time. It is, therefore, proposed that state-of-the-art regional

modern veterinary referral centres i.e. Regional Centres of LUVAS be established at following locations in a phased manner with mobility to cover the entire State*, so that farmers need not bring their animals to Hisar or Karnal for specialized treatment and they get such facilities close to their villages.

| | |
|---------------------------|------------------------------------|
| <i>Southern Haryana</i> | : <i>District Mahendergarh</i> |
| <i>Northern Haryana</i> | : <i>District Kaithal</i> |
| <i>South-East Haryana</i> | : <i>District Faridabad</i> |
| <i>Central Haryana</i> | : <i>District Karnal</i> |
| <i>Western Haryana</i> | : <i>District Sirsa/ Fatehabad</i> |

*Possibilities of land transfer (free of cost) from either Animal Husbandry Department or from Panchayats are being explored at different places.

These Regional Centres will have facilities for X-rays, Ultrasonography, operations, clinical diagnosis, artificial insemination, investigation of diseases, training of veterinarian and para-veterinary staff, analysis of feed/ feed ingredients, guidance and training to farmers for increasing productivity of their livestock through advice of subject matter specialists at each of the above locations in a phased manner. Sero-surveillance of the important diseases and compiling of epidemiological data will be a continuous process at these centres to create strong database for disease forecasting and control strategies.

Disease surveillance, economics and forecasting

To ascertain the exact status of various diseases in livestock and poultry in the state, a regular monitoring and surveillance mechanism will be established. Based on prevalence, preventive and control measures will be suggested. Economic losses due to various diseases will be calculated and economics of alternate control measures will be evaluated. With the application of GIS and collected surveillance data, the disease forecasting models will be developed for control and prevention of major diseases.

Instructional Livestock Farm Complex (ILFC)

Mandates

- To impart quality teaching & hands on practical in different subject of undergraduate & post graduate courses and to impart hands on training for internship students of final year Veterinary students.
- To create the infrastructural facilities including the required number of livestock for PG research.
- To improve the genetic potential of Murrah Buffaloes by conservation.
- To improve the modern managerial practices develop to the farmers & conduct the short term training for the Livestock entrepreneurs.

- To maintain and breed different breeds of Buffalo, Cattle, Sheep, Goat, Bullock and Poultry

The Directorate of ILFC will be having the following six units

- i. Instructional Animal Genetics and Breeding Unit
- ii. Instructional Livestock Production and Management Unit
- iii. Instructional Animal Nutrition Unit
- iv. Instructional Poultry Management Unit
- v. Instructional Milk Production Unit
- vi. Instructional Fodder Production Unit

Establishment of Central Animal House Facility

Central Animal House Facility of LUVAS will be committed to ensure the humane care and use of all animals associated with research and teaching programs after prior approval from CPCSEA/IAEC of the college/university. This facility will be having independent air conditioning system with high efficiency air filter and full air exchange rate, in compliance with the international standards and regulations for laboratory and experimental animals. This central facility will be having following units containing minimum of six rooms each equipped with all the modernized facilities/equipments according to International standards

- i. Large Animal Experimental House Unit
- ii. Small Animal Experimental House Unit
- iii. Poultry Animal Experimental House Unit
- iv. Laboratory Animal Experimental House Unit

Establishment of School of Laboratory Animal Medicine (SLAM)

Disease Free Small Animal House is a unique facility available in the University which was established in the year 1974-75. This unit is engaged in breeding of Laboratory animals viz. rabbits, guinea pigs, rats, mice and hamsters for the purpose of supplying to various department of this University and also to the other Research and Teaching Institute of Haryana and other States of India.

College of laboratory animal medicine have been developed around the world over the past fifty years, the first in North America and later in Europe and Asia. These Colleges ensure the quality of specialized understanding of laboratory animal medicine through a stringent process of examination of potential members. More recently, existing Colleges from

North America, Europe, Japan and Korea have combined forces to form the International Association of Colleges of Laboratory Animal Medicine (IACLAM). These members of colleges of IACLAM certify veterinary specialists in this field.

Vision of SLAM

The vision of School of LAM is the establishment of facility to certify the veterinarian having competency for Laboratory animal science/medicine and to create other trained human resources viz. Laboratory animal attendants, Laboratory animal technicians and other persons involved in research on Laboratory animals.

Establishment of Post-Mortem Centre

A well equipped post-mortem centre will be established in the LUVAS, to handle live animals and carcasses. The centre will offer diagnostic histopathology and clinical pathology expertise through trained veterinary pathologists. The centre will be having hydro-pressure mechanized system for washing and cleaning the area/floors, with high ceilings, natural lighting, post mortem tables, biological safety cabinets and integrated cold rooms all served by a powerful winch system. This main room will be of containment level 2 (CL2) facilities allowing the pathologist to perform the majority of post-mortem examinations for diagnostic purposes and will serve as the main gross pathology teaching area of the building. Students will observe and participate in post-mortem examinations of various species.

In addition, a smaller post mortem room with greater containment (CL3) will also be incorporated into the design of the building allowing veterinary pathologist to work safely with cases where there are significant potential or known infectious disease risks (including category 3 ACDP and SAPO infectious agents).

Dairy Development and Economics

- Traditional Indian dairy products will be one of the major areas of focus in research as this segment is economically most relevant and offers enormous opportunities for growth particularly in the organized sector of the dairy industry.
- Novel processing such as High Hydrostatic Pressure (HHP), Pulsed Electric Field (PEF), Ohmic Heating, Membrane Technology, Hurdle Technology, Biopreservation, Modified Atmospheric Storage, etc. and packaging options will be studied as conventional preservation techniques cannot be used for traditional dairy products.

- Scaling up of laboratory for mass production of quality dairy products of traditional Indian dairy products to make shift from unorganized to organized dairy industry.
- Incorporation of functional attributes in dairy products by various approaches such as use of artificial sweeteners, dietary fibres, incorporation of bioactive compounds, protein hydrolysates, micronutrients, synbiotics, reducing cholesterol, etc. and their validation using animal models and human clinical trials.
- Innovations in process mechanization for the manufacture of Indian dairy product will be one of the major areas of research.
- Rapid methods for monitoring quality and safety of dairy foods at field level will be developed by applying new tools and techniques such as nanotechnology, biosensors, and lateral flow assays, etc.

Development of biopreservatives for dairy foods by using biotechnological tools

The college would envisage contributing in the development of functional fermented dairy foods and other nutraceuticals for better human health.

The value addition of the dairy foods through the development of newer biotechnological and micro & nanotechnological approaches would bring in a new era of foods that would address the future needs of the mankind.

Studies on the diversity of the micro-organisms would further help in developing novel dairy foods with enhanced health attributes.

Rapid and efficient transfer of IPR enabled technologies through public private partnership.

Extension Education

An efficient extension system is required to create awareness, educate and motivate animal farmers to adopt new technologies for enhanced productivity and better health care of their livestock. Traditionally, person- to-person contacts with individuals or group of farmers has been practiced to disseminate information despite the fact that the number of extension workers engaged in livestock sector remains woefully inadequate. The field functionaries primarily responsible for providing health care and breeding services have also been undertaking extension activities. For an effective transfer of technology from the creator to the end-user, a multi-pronged strategy involving traditional as well as modern means of communication should be adopted to meet diverse information needs of different categories

of livestock owners. Extension worker should work as an animator rather than a disseminator of information. He should facilitate interactions, dialogues and discussions among the stakeholders. Similarly, a farmer should not be a passive recipient of information but an active collaborator. Keeping farmer at centre of all activity LUVAS proposes its sustainable vision for extension activities throughout the state of Haryana.

1. To create a database of the livestock farmers of the state and create a single platform for the progressive farmers, beginners and the strugglers in the field of livestock farming.
2. LUVAS at farmer's doorstep- Local extension centres at each block of the district of the state of Haryana will be aimed to open to provide all managerial and production related technical expertise to the farmers, right at their doorstep.
3. To promote and encourage livestock farmers to rear indigenous breeds of dairy animals.
4. Promotion of Self Help Groups, Self employment and entrepreneurial skills of dairy farmers of the state.
5. Associations/ Dairy Farmers and Entrepreneurs Association for economic development of farmers: Promotion of activities like formation of registered federations or associations on specialized areas like Dairy farmers, Cattle breeders, Fish Farmers, Pig Farmers, Poultry farmers etc. will be carried out to effectively put problems / necessities of related farmers.
6. Green fodder round the year: Encouragement of farmers to adopt specific cropping pattern to avail green fodder round the year especially in between sowing of wheat and paddy.
7. Promotion and adoption of Silage Making: Farmers will be encouraged to adopt such techniques by demonstration at / nearby their own farms.

Establishment of Pashu Vigyan Kendra

Nothing can be achieved without making farmers aware about the latest developments and methodologies that can help in better livestock production and health. For example farmers in the state are not aware of the role of mineral mixtures in ration, parasitic problems, different vaccines and time for vaccination, value addition of milk, meat and eggs and its products etc. Extension Education is an important component of any Veterinary and Animal Science University and the image of the university among the farmers is also reflected by its extension services. The Extension Education activities are also part of the mandate of any State or Central Veterinary University and ICAR as well. In view of the above, the LUVAS intends to establish 'PashuVigyan Kendra' at the level of each district which will help to make Animal Extension system more effective. In general, the livestock sector is invariably overshadowed by crop industry. The

‘PashuVigyan Kendra’ must have on-line access to experts in the different filed. This way, the dissemination of information from the researcher to the end-user will become more efficient and fast.

Dairy Development and Extension

In India most of the trade of Indian milk sweets is with the unorganized sector and the small-scale operators. Most of them have art and skill of manufacturing varieties of indigenous dairy products. However, no attention is paid by them on quality of milk, hygienic handling, proper packaging and storage due to ignorance. The training of operators in this sector in hygienic handling and quality control aspects will go a long way in improving the quality of these products. This college would like to play a active role in training of small entrepreneurs.

All efforts will be made to integrate various private agents to the dairy extension mechanism to cover large number of rural masses, which will help in the nutritional security of the nation.

Information technology will be used for developing databases on a uniform platform, which can be shared by the potential users including planners, administrators, policy makers, economists and the scientific community at large.

Capacity building of farmer by providing suitable training and inculcating entrepreneurial characters will help in livelihood security and in turn, it will pave the road of holistic economic prosperity.

Objective trainings for students, faculty and industry personnel will be implemented.

LUVAS Vision 2030- At a Glance

| Goals | Approach | Performance Measures |
|---|---|---|
| Improving animal productivity | <ul style="list-style-type: none"> ▪ Genetic improvement in indigenous animals through comprehensive breeding policies | <ul style="list-style-type: none"> ▪ Increase productive output of farm animals |
| Improvement of feed management and feed supplementation | <ul style="list-style-type: none"> ▪ Developing balance ration and area specific mineral supplements ▪ Efficiency analysis of advanced feed supplements and additives ▪ Development of cost effective feed processing mechanisms | <ul style="list-style-type: none"> ▪ Reduction in cost input for feed & fodder management. ▪ Reduction in deficiency associated diseases |
| Management of infertility problem thereby improving animal reproductive performance | <ul style="list-style-type: none"> ▪ Development of pregnancy diagnosis kit ▪ Development of ultrasound based diagnostic facilities ▪ Development of SOPs for hormonal therapy | <ul style="list-style-type: none"> ▪ Improved fertility leading to better production contributing significantly to overall productivity. |
| Disease Diagnosis and Prevention | <ul style="list-style-type: none"> ▪ Development of rapid disease investigation team for immediate confirmatory disease diagnosis ▪ Epidemiological studies of causes and spread of diseases ▪ Development of rapid disease diagnostic tests for various bacterial, fungal and viral diseases ▪ Establishments of regional disease investigation labs | <ul style="list-style-type: none"> ▪ Immediate containment of infectious diseases ▪ Reduced economic losses ▪ Mitigation of vaccination policy |
| Achieving excellence in clinical services | <ul style="list-style-type: none"> ▪ Development of diagnostic and therapeutic modalities for production, deficiency, toxicological and non-infectious diseases. ▪ Development of facilities and expertise in the areas of veterinary surgery, gynaecology and medicines. ▪ Developing biomaterials, and implant for management of surgical disorders. ▪ Development of cutting edge facilities and | <p>Early diagnosis and intensive animal care for better recovery from diseases.</p> |

| | | |
|---|--|--|
| | expertise for digital radiography, diagnostic ultrasound, CT and MRI. | |
| Development of technologies for value addition | <ul style="list-style-type: none"> ▪ Development of methods, protocols and mechanisms for value addition of milk and meat products ▪ Training for framers to implement value addition based approaches ▪ Conducting training on animal food safety issues and development of mechanism for detection of food adulteration ▪ Development of analytical methods for detection of food contaminants, pesticide, antibiotic and drug residues | <ul style="list-style-type: none"> ▪ Increase in overall profit to farmers ▪ Women empowerment ▪ Increase household income |
| Animal Husbandry Extension | <ul style="list-style-type: none"> ▪ Dissemination of information and technologies through digitization ▪ Conducting kisan melas, mahila samelan, gosawardhan and gosangopan gosthis and other training programs ▪ Develop and implement strategy of e-connectivity, mobile connectivity to drive full advantage of the available human for their best utilization within a short time. | <ul style="list-style-type: none"> ▪ Prompt and effective exchange and dissemination of information regarding the animal disease and available technologies amongst the end users. |
| Human resource development and entrepreneurship development | <ul style="list-style-type: none"> ▪ To impart education in different branches of veterinary, animal sciences, fishery sciences and allied sciences, as it may determine from time to time. ▪ To further advancement in learning and research in veterinary, animal sciences, fishery sciences and other allied sciences and to undertake extension of such specialized knowledge to the needy people. ▪ To undertake study in marketing strategies of live-stock and live-stock products, conservation of live-stock breeds and wild animals | <ul style="list-style-type: none"> ▪ Improved quality of graduate and postgraduate teaching and research in service of society. ▪ To develop knowledge empowered society ▪ To imbibe true spirit for entrepreneurship |

Master Plan : New Campus of LUVAS



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