

PROCEEDINGS WORKSHOP ON

Career Development in Veterinary and Animal Sciences

10th April, 2025

West Bengal Veterinary Council Building, Belgachia
Kolkata- 700037, West Bengal, India

Be a Professional to hit your goal



Career Guidance for -

- Scopes of Technology Transfer
- Skill Development
- Academic & Public Service Opportunities
- Industry Role and Entrepreneurship

PROGRAMME OBJECTIVES

- Discover Your True Calling
- Search & Set Clear Goals with confidence
- Develop Essential Skills

Organised by : INDIAN JOURNAL OF ANIMAL HEALTH

Published by: West Bengal Veterinary Association

37, Kshudiram Bose Sarani, Kolkata-700037

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Workshop: Career Development in Veterinary and Animal Sciences, Indian J Anim Health, Kolkata 10 April, 2025

Proceedings Workshop- 2025

on

Career Development in Veterinary and Animal Sciences

10th April, 2025

at

**West Bengal Veterinary Council Building, Belgachia
Kolkata- 700037, West Bengal, India**

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MESSAGE

It is a matter of great satisfaction that West Bengal Veterinary Association, a professional body, is publishing a biannual journal dedicated to the cause of animal health in the country. IJAH, a biannual journal has gone from strength to strength in E A's recent years and not only the quality of the papers published, but the varied areas of subject matter included in the journal makes the publication versatile and among the front ranking Journal among the professional publication of field veterinarian publications in the veterinary and animal science in the country.

Through, professional self-esteem, this professional society in the country has distinguished itself in the area of disseminating health research and development information. To its members in particular and to the field health professionals in general, Indian Journal of Animal Health has discovered itself through efficient management, as evidenced by the quality of the research papers.

Any quantum jump in livestock production in the country is greatly dependent on health and welfare of the livestock population. Whereas, at one time the country came under the dark clouds of widespread viral and bacterial disease breakouts, it is the veterinary professionals of the country, who through a coordinated research approach, have been able to not only eliminate viral diseases but control several of them, this giving a considerable economic support to livestock owners who are poor and are landless or with a limited resource base. It is here that IJAH is providing a critical mass of information to veterinarians. It's calculated that a 10% decrease in the disease load on our animals is going to boost productivity by nearly 20%.

That the credit ranking of the journal has over years increased and is now being ranked as one of the leading society publications in the country, goes a long way in speaking about the dedicated approach which the Editorial Board has in elevating the professional standard.

I wish the one Day workshop all success.

Padma Shri Prof. M L Madan

Former Vice Chancellor, Deendayal Upadhaya University of
Veterinary Science, Mathura, UP; Former Vice Chancellor,
Punjabrao Deshmukh Agricultural University, Akola, MS; Former
Deputy Director General (Animal Sciences), ICAR, New Delhi
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**Sher-e-Kashmir University of Agricultural
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Dr B.N. Tripathi
Ph.D FRCPATH (England)
FNAAS | FNAVS | DICVP
Vice-Chancellor

MESSAGE

I am writing to express my sincere appreciation to the Indian Journal of Animal Health for organizing the workshop on *“Career Development in Veterinary & Animal Sciences.”* This initiative is timely and essential for advancing the field and empowering professionals with the tools to navigate the evolving landscape of Veterinary and Animal Sciences.

The inclusion of diverse topics such as technology transfer, skill development, academic opportunities, public services, and the role of industry and entrepreneurship is particularly noteworthy. These areas are crucial for equipping participants with the knowledge and practical skills needed to thrive in their career. The presence of renowned experts to share their insights will undoubtedly provide invaluable guidance and foster meaningful discussions.

Such workshop not only enhances career prospects but also contribute to the overall growth of the sector by fostering collaboration between academia, industry, and public services. I am confident that this event will inspire participants and help them explore diverse career opportunities and avenues for professional development.

Once again, thank you for organizing this much-needed event. I wish the organizers for its great success and look forward to hearing more about the outcomes of this workshop.

Best Wishes,

Bnhipathi
(B. N. Tripathi)

Prof. Pradip Kumar Das
Editor-in-Chief, Indian Journal of Animal Health
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“An Agricultural institution for sustainable food, nutrition and economic security”

Message

Dear workshop attendees

I am delighted to see this platform fostering exploration of career opportunities in academics, research, practice, and entrepreneurship, both in India and abroad. The field of veterinary science is not just about treating animals; it's about safeguarding public health, advancing scientific research, and contributing to global food and nutrition security.

Your journey in this noble field equips you with unique skills and expertise that open doors to diverse opportunities, both in India and abroad. I encourage you to explore the vast horizons of academics, research, professional practice, and entrepreneurship, each offering its own rewards and challenges.

In academia, you can shape the next generation of veterinarians while advancing knowledge through teaching and mentorship. Research offers a platform to innovate, address pressing global challenges like zoonotic diseases, and contribute to scientific progress. For those inclined toward practice, the growing demand for veterinary services—be it in animal healthcare, public health, or industry—presents a fulfilling career path. Meanwhile, entrepreneurship beckons the bold among you to create start-ups, develop products, or offer specialized services, tapping into an expanding market in India and beyond.

This workshop is a platform to connect, learn, and plan your career trajectory. Engage with experts, share experiences, and understand the nuances of navigating your career in this ever-evolving field.

I wish you all a fruitful and enlightening sessions, and may your career in veterinary science be both rewarding and impactful.



Gaya Prasad

Former Vice chancellor, Sardar Vallabhbhai Patel
University of Agriculture & Technology, Meerut
&

Advisory Board Member, IJAH

Workshop: Career Development in Veterinary and Animal Sciences, Indian J Anim Health, Kolkata 10 April, 2025



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Dr. Tirtha Kumar Datta
Vice Chancellor

No. : VCS/WBUAFS/ M-5/740

Date 03-04-25

MESSAGE

I am glad to learn from that “The Indian Journal of Animal Health” is organizing an one-Day Workshop on career Development in Veterinary and Animal Sciences” on 10th April, 2025 at the West Bengal Veterinary Council Bhaban, Belgachia, Kolkata. I have also learnt that a compendium will be published during the Workshop.

Every year a large number of graduates from the Veterinary & Animal Sciences Institutes/ Universities pass out, of which many Graduates opt for higher studies in the field. The rest of them get engaged in the Government sector or take up profession as practicing Veterinary Doctors and some of them opt for entrepreneurship ventures. This is very encouraging.

It is the responsibility of the career professionals to guide the fresh graduates from the Veterinary discipline to make them chose the appropriate avenues to farther their career.

I am optimistic that the “One-Day Workshop on career Development in Veterinary and Animal Sciences” will encourage the aspiring Veterinarians to chose the right path. I hope that such Workshops will be organized periodically for career guidance of the fresh Veterinarians.

I wish all the success for the programme.


(Dr. Tirtha Kumar Datta)

Prof. Pradip Kumar Das
Editor-In-Chief, Indian Journal of Animal Health
37, Kshudiram Bose Sarani, Kolkata-700037

Workshop: Career Development in Veterinary and Animal Sciences, Indian J Anim Health, Kolkata 10 April, 2025

Prof.Dr.Mahendra Pal

MVPH, Ph.D., D.Sc.

Recipient of Padma Shri Award in Science

Founder and Managing Director

Narayan Consultancy on Veterinary Consultancy

B-103, Sapphire Lifestyle, Maktampur Road

Bharuch, Gujarat, India

Dated **05-04-2025**

MESSAGE

It is, truly, a great pleasure to know that the Indian Journal of Animal Health is organizing a One-Day Workshop on “Career Advancement in Veterinary and Animal Sciences” on 10th April, 2025, in Kolkata, India. The theme of this workshop is both timely and highly relevant in today’s rapidly evolving professional landscape.

Outstanding contributions by some renowned veterinarians, such as Dr. Jacob Nufer (who performed the first caesarean section on a living woman), Dr. Gurein (who developed the BCG vaccine with Dr. Calmette for tuberculosis), Dr. Johannes Essan (pioneer in human ovariectomy), Dr. Daniel Salmon (discovered Salmonella), Dr. Calvin Schwabe (proposed the One Health concept), Dr. Peter Doherty (Nobel Laureate in Medicine), and Dr. M. Pal (noted for his work in zoonotic diseases), have left an indelible mark on global health and continue to inspire generations.

There are many opportunities in veterinary and animal sciences, such as general practice, specialized practice, management of farm animals, public health, animal welfare, zoological garden, wildlife conservation, feed industry, vaccine institute, pharmaceuticals, diagnostic centres, occupational health, biotechnology, food safety, laboratory animal, abattoir, border security force (BSF), remount veterinary corps (RVC) etc. In addition, veterinary students can join the academic field in the universities.

Moreover, emerging fields, such as forensic veterinary science, aquatic animal health, and animal-assisted therapy are opening new avenues for professionals who wish to contribute uniquely to animal and human well-being. These career paths reflect the expanding scope of veterinary sciences in addressing contemporary societal needs. I strongly believe that veterinarians are performing a noble service to society by safeguarding the health of animals that provide nutritious food like milk, butter, cheese, eggs, fish, and meat that are essential for human health and development.

I am sure that the deliberations during the workshop will certainly Message for One-Day Workshop on Career Development in Veterinary and Animal Sciences. I commend the organizers for their initiative in creating a valuable platform to guide and inspire students and professionals towards impactful careers in this vital field. Veterinary and animal sciences play an indispensable role in ensuring animal welfare, maintaining public health, and safeguarding food security. With the increasing global demand for skilled professionals, this discipline offers a wide array of career opportunities, ranging from clinical practice and public health to research, education, and industry.

Let me conclude with a thought from the Shrimad Bhagavad Gita:

“You have the right to perform your duty, but never to the fruits of your work. Let not the fruits of action be your motive, nor let your attachment be to inaction.”

May this message inspire you all to pursue your careers with dedication, compassion, and a commitment to lifelong learning. be very beneficial to the students of veterinary science and animal husbandry.

I convey my best wishes for a grand success of the workshop organized under the dynamic leadership of Prof. Pradeep Kumar Das and his dedicated team.

Mahendra Pal

Advisory Board Member, IJAH

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Workshop on: Career Development in Veterinary and Animal Sciences

Organised by: Indian Journal of Animal Health

Venue: West Bengal Veterinary Council Building, Belgachia, Kolkata

Date: 10th April, 2025 (Thursday)

Programme Schedule

Time	Activity	Details	Speakers
9.00 AM	Registration	Registration of Participants and distribution of workshop kits (Registration fees Rs.50/-) Maximum registration = 80 nos	
9.30 AM	Inaugural Session	a. Keynote address by the Editor b. Address by Vice Chancellor on the <i>Future of Veterinary and Animal Sciences in India</i>	Welcome and about the theme of the workshop: Prof. P. K Das , Editor-in-Chief, IJAH Speech of the Chief Guest: Dr. B. N. Tripathi (Online) , Vice-Chancellor, SKUAST-Jammu Inaugural Speech: Dr. T. K. Datta , Vice-Chancellor, WBUAFS Speech from the desk of Publisher and Vote of thanks: Dr. N. R. Kole , General Secretary, WBVA (Publisher) Session Coordinator: Dr. Aloke Mukherjee , Former Registrar, West Bengal Veterinary Council
10.00 AM	Session1:	Scopes of Technology Transfer Overview of emerging career opportunities in Research, Extension & Clinical Practice in Veterinary Sciences	Chairman: Prof. Sitangsu Mohan Deb , Emeritus Professor, ICAR, WBUAFS Co-Chairman: Dr. Arun Kumar Das , PS, ICAR-IVRI, ERS, Kolkata Session Coordinator: Dr. Joydip Mukherjee , Head, Dept. of Vety, Physiology, WBUAFS (i) Speaker: Dr. Divakar Hemadri (Online), ADG (Animal Health), ICAR, Delhi, India (ii) Speaker: Prof. Arunasis Goswami , Professor, Department of VAHEE ,WBUAFS (iii) Speaker: Prof. Subhasis Batabyal , Professor, Department of Veterinary Biochemistry, WBUAFS (iv) Speaker: Dr. Subir Bhattacharya , Eminent Veterinary Consultant
11.00 AM	Tea Break		
11.15 AM	Session 2:	Skill Development Focused training on: Soft Skills: Communication and networking (Interaction with professionals), AI based advancement, ICT etc Technical Skills: Emerging tools and technologies in Veterinary and Animal Sciences	Chairman: Dr. Santanu Banik , Head, ICAR-NDRI, ERS, Kalyani, Nadia Co-Chairman: Dr. Chandra Kanta Jana , PS, Veterinary Pathology Division, ICAR-IVRI, Izahnager, Bareilly, UP Session Coordinator: Dr. Shamik Polley , Head, Dept. of Vety, Biochemistry, WBUAFS (i) Speaker: Dr. Sourav Chatterjee , Sub Divisional Magistrate, Durgapur (ii) Speaker: Dr. Goutam Mondal , Principal Scientist, ICAR-NDRI, Karnal
12.15 PM	Session 3:	Academic & Public Service Opportunities Opportunities in advance studies and professional development	Chairman: Prof. Samit Kumar Nandi , National Professor, ICAR, WBUAFS Co-Chairman: Prof. Chanchal Debnath , Professor, Dept. of VPH, WBUAFS Session Coordinator: Dr. Ayan Mukherjee , Head, Dept. of Animal Biotechnology, WBUAFS (i) Speaker: Dr. Ramanuj Banerjee (Online), Counsellor (Science & Technology), Embassy of India, Tiergartenstrabe 17, 10785 Berlin, Germany (ii) Speaker: Dr. Sujit Dutta , Joint Commissioner, Animal Husbandry, Government of India (iii) Speaker: Prof. Siddhartha Narayan Joardar , Professor, Dept. of Vety. Micro, WBUAFS
1.15 PM	Lunch Break		
2.00 PM	Session 4:	Industry Role and Entrepreneurship Role of Industry in Professional Development	Chairman: Prof Subhasis Biswas , Professor, Dept. of LPT, WBUAFS Co-Chairman: Dr. Tapas Kumar Ghoshal , PS & Head, ICAR-CIFE, Kolkata Session Coordinator: Dr. Ruma Jas , Assistant Professor, Dept. of Vety, Parasitology, WBUAFS (i) Speaker: Dr. Bhaskar Chaudhuri , Managing Director, Liebig's Agro Chem Pvt. Ltd (ii) Speaker: Dr. Sushanta Saha , Regional Sales Director, S & SE Asia, Bentoli Agri Nutrition India Pvt. Ltd. Chairman, Co-Chairman, Speakers and Coordinators will conduct the respective workshop
3.00 PM	Workshop	Parallel 4 Workshops	
4.30 PM	Concluding session	Sum-up by experts including Feedback from participants and a vote of thanks.	Chairman: Prof. Barun Roy , Former Chief Editor, IJAH • Report of the Chairmen of all sessions Brief report of the Workshop: Dr. Gour Hari Mondal , Secretary, Publication Board, IJAH Concluding Remarks: Dr. Indranil Samanta , Executive Editor, IJAH Vote of Thanks: Dr. T. Adak , Chairman, Publication Board, IJAH Session Coordinator: Dr. Srinibas Das , Assistant Professor, Dept. of Fish Nutrition, WBUAFS

Workshop on Career Development in Veterinary and Animal Sciences

Pradip Kumar Das¹ and Indranil Samanta²

¹ Editor-in-Chief, Indian Journal of Animal Health

² Executive Editor, Indian Journal of Animal Health

The backdrop of the initiative

The animal health care profession plays an essential role in India's economic and industrial development, particularly in the livestock and agriculture sectors. With over 70% of the rural population engaged in agriculture and animal husbandry, veterinarians serve as the backbone of livestock management, disease control, and productivity enhancement. The expertise of veterinarians extends beyond clinical advice to embrace food safety, public health, biotechnology, and entrepreneurship. Additionally, veterinary and animal sciences drive bio-economy by ensuring livestock health and advancing dairy, meat, poultry, leather, and pharmaceuticals. Currently, science is considered an important discipline around the world and there is a steady demand for professionals. Worldwide nations are realizing the value of animal health for better and healthy living of humans, food security as well as environmental sustainability. From traditional roles in academia and research to cutting-edge careers in digital health solutions, the veterinary profession is constantly expanding. Precision livestock farming and climate-resilient animal breeding not only address current challenges but also create meaningful career opportunities that contribute to global well-being. Whether it's advancing scientific discoveries, influencing policies, developing innovative technologies, or establishing entrepreneurial ventures, the possibilities are vast and transformative. This field presents an array of opportunities that are continually evolving in tandem with global advancements.

However, career planning is a crucial step that can determine the direction of one's professional life and prospects. To effectively prepare for a career, focus on self-assessment, skill development, gaining practical experience, knowledge about available technologies and mentality to be ready always for active learning. Hereby, the *Indian Journal of Animal Health*, one of the oldest journals associated with veterinary/animal/fishery/dairy sciences in the country wished to organize a national-level career counseling workshop as a professional responsibility for undergraduate/postgraduate/Ph.D. students of Veterinary and Animal Sciences, junior veterinarians working under MVC/MVU to show them an impression of what is present at the end of the journey they have started aiming for a competent, skilled, expert, knowledgeable and *smart professional*.

Expected outcomes from the workshop

Since independence, India's livestock sector has grown tremendously due to government initiatives, scientific advancements, and policy reforms. The White Revolution, veterinary healthcare improvements, and research institutions have enhanced milk, meat, and egg production, increasing rural incomes and employment. Veterinarians have been central to this transformation by implementing disease control programs, improving breeding techniques, and supporting livestock-based industries. Today's workshop will successfully explore veterinarians' diverse roles in shaping the country's economy, focusing on livestock productivity, public health, policy advocacy, and entrepreneurial opportunities, emphasizing their contributions beyond traditional veterinary practice. We will discuss the takeaway messages in each session.

- a) **Scope of technology transfer:** In this session, the reputed speakers, like Dr. D. Himadri, Prof. S. Batabyal, Dr. S. Bhattacharya under the chairmanship of Dr. S.M. Deb and co-chairmanship of Dr. Arun Kumar Das

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would explain the expanding horizons in veterinary and animal sciences, involving the application of research findings and innovations to practical and commercial uses. Examples include but are not restricted to affordable diagnostics, Indigenous vaccines, therapeutics for local clinical conditions, addressing antimicrobial resistance with alternative therapy, reproductive biotechnology like AI/IVF, fortified feed, integrated disease surveillance programme with one health approach, transforming veterinary education including e-learning platform, climate resilient breeding policies, waste management solutions, entrepreneurship and start-ups like telemedicine platform, biotechnology venture, equipment and tool manufacturing, and supporting wildlife health and conservation.

- b) Skill development:** In this session, the reputed speakers, like Dr. S. Chatterjee, Dr. G. Mondal under the chairmanship of Dr. S. Banik and co-chairmanship of Dr. C. Jana would explain how artificial intelligence-based tools can be used for better disease surveillance and monitoring of the livestock, especially wildlife and how the informal animal health care providers or farmers in a remote place can work for better animal health under the mentorship of experienced formal veterinarians. Blockchain for livestock traceability ensures transparency and trust in food systems. Practical training in embryo transfer, artificial insemination, ultrasonography, and genetic improvement methods empowers professionals to revolutionize animal productivity. Automated dairy farming systems optimize operations, reduce labour-intensive processes, and enhance production. Green livestock production, focusing on eco-friendly methods, is gaining momentum in developed countries to combat environmental challenges and promote sustainability.
- c) Academic and public service opportunities:** In this session, the reputed speakers, like Dr. R. Banerjee, Dr. S. Dutta, Prof S.N. Joardar under the chairmanship of Prof. S.K. Nandi and co-chairmanship of Prof. C. Debnath is expected to be explained for academic and public service opportunities basis requirement of B.V.Sc. & A.H. degree. However, post graduate specialization in any particular subject is preferred in some specialized sectors. Other than recruitment, as veterinary officers in different State Government and Central Government Departments, the Indian Veterinary Service (IVS) is a prestigious career option in which veterinarians can be recruited into the civil services under the Indian Administrative Service (IAS) but in a specialized veterinary role. After doing a Ph.D. they can join as a scientist or teacher of the Veterinary and Animal Sciences discipline in different government institutions under ICAR/ ICMR/ DBT/ DST and State/Central Agriculture/Veterinary Universities. Joining the Indian Army as a Remount Veterinary Corp is another prestigious career option.
- d) Industry role:** In this session, the reputed speakers, like Dr. B. Chaudhuri, Dr. S. Saha under the chairmanship of Prof. S. Biswas and co-chairmanship of Dr. T. K. Ghoshal will deliver the present role of various industries that actively seek veterinary expertise for different functions, including research, product development, technical services, sales, and marketing. Examples include but are not restricted to the manufacturing of veterinary medicines, vaccines, and biologicals, research and development (R&D) for new drug discovery, quality assurance and regulatory compliance, development and sales of feed supplements, technical consultancy for livestock and poultry farmers, poultry and dairy farm management, hatchery operations and integration processes, meat production and processing industries. Emerging opportunities include working in financial institutions supporting livestock farmers, assisting in credit assessment for dairy and poultry businesses, consulting on-farm investment and risk management, evaluating claims related to livestock mortality and diseases, and managing risk assessment for poultry and pet insurance.

Career Development in Veterinary and Animal Sciences

Arun Bhunia, Advisory Board Member, IJAH

**Professor of Molecular Food Microbiology
Purdue University, West Lafayette, IN, USA**

Career Research Goals (Bhunias)

- 1. Understanding Pathogenic Mechanisms:** Investigating how foodborne zoonotic microbial pathogens affect humans.
- 2. Probiotics Bioengineering:** Developing probiotics to prevent infections in humans and livestock.
- 3. Diagnosis and Detection Technologies:** Creating technologies for pathogen detection and diagnosis.

Academic Path

Preparation:

Undergraduate Degree (BVSc & AH):

- Gain laboratory research experience.
- Shadow graduate students and engage in their research.
- Formulate scientific questions and identify problems to solve.
- Learn to design experimental protocols and gain hands-on experience.
- Develop self-motivation and communication skills (both written and oral).
- Communicate effectively with stakeholders and those unfamiliar with the subject.
- Participate in poster presentations, conferences, and attend scientific meetings.

Graduate Degrees (MS or PhD):

- Commit to and show dedication and passion for research problems.
- Ensure research quality, depth, and rigor.
- Uphold ethical integrity.
- Publish peer-reviewed research in high-impact journals.
- Develop strong written and oral communication skills.
- Demonstrate professionalism.

Postdoctoral Research Training:

- Focus on academic preparation and research topics.
- Maintain research quality and depth.
- Publish peer-reviewed research in high-impact journals.
- Enhance written and oral communication skills.
- Exhibit professionalism.

Faculty Position:

- Set clear career goals in research and teaching.
- Show motivation for educating future generations.
- Develop grantsmanship skills.
- Establish and execute a research program.

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- Engage in translational research.
- Achieve national and international recognition.
- Foster student performance and success.

Private Industry Path

Preparation:

- Seek certification and training opportunities beyond undergraduate education.
- Improve technical and vocational skills.
- Develop strong communication and interpersonal skills.
- Demonstrate professionalism.

Government Path

Preparation:

- Pursue certification and training opportunities beyond undergraduate education.
- Enhance technical and vocational skills.
- Develop strong communication and interpersonal skills.
- Understand government regulations, rules, and laws.

Session 1

Scopes of Technology Transfer

Overview of emerging career opportunities in Research,
Extension & Clinical Practice in Veterinary Sciences

Career development in veterinary and animal sciences: Scopes of technology transfer

Sitangsu Mohan Deb

Emeritus Professor

West Bengal University of Animal and Fishery Sciences

37, Khudiram Bose Sarani, Belgachia

Kolkata, West Bengal- 700037, India

Veterinary science has a great scope in various diverse sectors, viz. animal husbandry department, veterinary hospitals, public health department, poultry sector, dairy sector, wildlife reserves, zoological parks, veterinary universities, research institutes/laboratories, pharmaceutical companies, food industry, animal welfare organizations, army and paramilitary forces etc. Veterinary and animal science is an important discipline around the world and there is steady demand for the professionals. The nations worldwide are realizing the value of animal health for human and animal welfare and food security as well as environmental sustainability. This recognition leads to a lot of employment prospects for veterinarians and animal scientists willing to operate across the globe.

However, career planning is a crucial step that can determine the direction of one's professional life and career prospects. To effectively prepare for a career, focus on self-assessment, skill development, gaining practical experience, knowledge about available technologies and always be ready for learning which are relevant to the organization, one wish to serve.

With the rise of world population, environmental challenges, and growing consumer demands for quality, the demand for animal products increases and there is an increasing need to modernise animal husbandry practices. Livestock production is a dynamic and evolving sector that is influenced by various trends, innovations, and challenges. The current trends in livestock production highlight the importance of sustainable intensification, enhancing productivity, animal welfare and digitalization. Over the last decade, India has seen a surge in technological innovation across various sectors, including animal husbandry. These innovations promise to create a more efficient, sustainable, and profitable future for the animal husbandry sector. The transfer of technology is vital for enhancing the animal husbandry sector's productivity, efficiency, and sustainability.

Total milk and egg production in the country is 230.58 million tons and 138.38 billion numbers respectively during 2022-23. Current production of livestock and poultry has increased several folds in comparison to 1950-51. The well-structured research programmes of Indian Council of Agricultural Research and agricultural/veterinary universities have played a pivotal role in technology driven progress in livestock sector of the country.

The inventories of technologies in veterinary and animal science sector may be classified as:

Genetic improvement: Development of new breed/strains and enhanced productivity of cattle, buffalo, sheep, goat, pig and poultry have been achieved.

Genomic technology: Both the dairy and meat industries are leveraging genomic selection to improve livestock quality and productivity. Additionally, emerging gene-editing technologies such as CRISPR hold great promise for revolutionising animal husbandry by improving disease resistance and productivity.

Reproductive techniques: The assisted reproductive technologies (ARTs) such as artificial insemination (AI), multiple ovulation and embryo transfer (MOET), In-Vitro Fertilization (IVF), somatic cell cloning, estrous detection and sperm sexing have been developed.

Nutritional interventions: The feed technologies have helped in reducing the cost of animal and poultry feed along with augmenting nutrient availability and improving the feed efficiency. A number of alternate feed resources, supplements and additives were identified and standardized for formulation of low-cost rations. The feed formulations and practices were also standardized for mitigating methane emission and stress especially during summers. For efficient use of feed resources, technologies like fodder block, pellet making, extrusion, complete feed block (total mixed ration) have been developed. Technology developed for utilizing crop residues and other feed resources for reducing feed costs.

Animal health management: Development of vaccine, diagnostics and therapeutics for several animal diseases. Developed tools for surveillance, monitoring and analysis of livestock diseases in India and forecasting. Repository of veterinary microbes, dairy microbes and rumen microbes are characterized and maintained for further research. Development of next generation diagnostics and novel vaccine candidates for important livestock and poultry diseases are in progress. Veterinary telemedicine is also standardized to provide remote consultation and diagnostics to farmers.

Value addition of livestock products: Flavoured milk or drink in combination with natural fruits juices or pulps, high milk protein drinks, fermented dairy beverages with unique microbial starter and herb-milk beverage have been developed. Long-life and convenient ready-to-make mixes for paneer, milk cake and other sweets have been developed. Technology for low cholesterol ghee and Arjuna herbal ghee has been developed. Health foods using judicious blends of milk/milk constituents and cereals/plant commodities have been developed. Therapeutic virtues of herbs are harnessed by suitably incorporating their bioactive-rich fractions in products like fermented milk, ghee, and sweets. Probiotics in dairy products development as an ideal vehicle for delivering the probiotic in diet has been achieved. Processing of meat is primarily done to add value to meat, better profit and scope for export. The products like enrobed eggs and enrobed/ coated meat products are getting popular. Recipes for products like restructured meat products and cured and smoked meat products, heritage products, shelf stable ready-to-eat meat products, fermented meat products and functional foods were developed.

Precision livestock farming: It is revolutionising the way animal husbandry is conducted by integrating cutting-edge technologies like Artificial Intelligence (AI), the Internet of Things (IoT), and data analytics. In India, its adoption is gaining traction due to the immense potential for increasing productivity and efficiency. AI algorithms and IoT devices are now being used to monitor animals' health in real-time. Sensors placed on livestock can track vital signs such as heart rate, body temperature, and activity levels. This data is processed using machine learning algorithms, allowing for early detection of diseases and optimisation of feeding practices. Remote monitoring tools allow veterinarians/ farmers to oversee animal health and productivity from afar, providing timely interventions when needed. Mobile apps are potential digital tools which can be effectively utilized to reach animal husbandry information to a large number of farmers within a short period of time.

Thus, there is a huge scope for development of technologies and transfer in veterinary and animal science sectors. The veterinarians must be involved in both development and transfer of those technologies for sustainable progress in these sectors, as well as, enhancing the job opportunities and career prospects of veterinarians.

Co-Chairman's Speech- Session 1

Scopes of technology transfer: Overview of emerging career opportunities in research, extension and clinical practice in veterinary sciences

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Introduction

The field of veterinary sciences has evolved beyond traditional clinical practice, now encompassing cutting-edge research, technology-driven extension services, and value-added animal product industries. Technology transfer—the process of translating scientific innovations into practical applications—plays a crucial role in enhancing livestock productivity, improving animal health, and boosting the economic viability of animal-based products. With advancements in biotechnology, food processing, and digital agriculture, new career opportunities are emerging in research, extension, and clinical practice within veterinary sciences. This write-up explores the scope of technology transfer in veterinary sciences, with a special focus on animal products, value-addition, and entrepreneurship, while highlighting recent career opportunities in India and abroad.

Importance of technology transfer in veterinary sciences

1. Enhancing animal productivity and health

Technology transfer ensures that innovations in vaccines, diagnostics, breeding techniques, and nutrition reach farmers, improving livestock yield and reducing disease burden.

2. Value-addition in animal products

- Dairy and meat processing: Advanced technologies in cold chain management, packaging, and biofortification enhance product quality.
- By-product utilization: Waste-to-wealth approaches convert hide, bones, and blood into collagen, gelatin, and pharmaceuticals.
- Functional foods: Development of probiotic dairy products, omega-3 enriched eggs, and low-fat meat for health-conscious consumers.

3. Strengthening One Health and food security

- Zoonotic disease control: Rapid diagnostics and surveillance systems help prevent outbreaks (e.g., avian flu, rabies).
- Antimicrobial resistance (AMR) management: Smart farming reduces antibiotic misuse in livestock. Veterinary sciences contribute to zoonotic disease control, antimicrobial resistance (AMR) monitoring, and food safety.

4. Digital and precision livestock farming

- IoT-based monitoring (wearable sensors for cattle health tracking).
- AI-driven feed optimization and automated milking systems.

Emerging career opportunities in veterinary sciences

1. Research and development (R&D) in animal products and biotechnology

With increasing demand for high-quality, safe, and functional animal products, R&D roles are expanding: Career pathways:

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- Food technologist (Animal products): Develops value-added dairy, meat, and egg products (e.g., probiotic yogurt, low-cholesterol meat).
- Biotechnologist in animal by-products: Works on collagen extraction, pharmaceutical-grade gelatin, and pet food innovation.
- Nutraceutical researcher: Formulates health supplements from animal-derived compounds (e.g., chondroitin from cartilage).

Employers in India and Abroad:

- India: NDRI (National Dairy Research Institute), CFTRI (Central Food Technological Research Institute), Amul, Venky's.
- Global: Nestlé, Danone, Cargill, Zoetis, Elanco.

2. Extension and entrepreneurship in animal product value-addition Career pathways:

- Livestock product development consultant: Guides farmers on cheese, yogurt, and meat processing techniques.
- Agri-business entrepreneur: Establishes small-scale dairy processing units, pet food startups, or collagen-based cosmetic ventures.
- Export compliance specialist: Ensures meat, dairy, and seafood products meet international standards (FSSAI, USDA, EU regulations).

Opportunities in India:

- Government schemes:
 - ✓ Animal Husbandry Infrastructure Development Fund (AHIDF) – Supports meat and dairy processing units.
 - ✓ Startup India – Funds agri-tech and food processing startups.
- Private sector: Companies like Suguna Foods, Godrej Agrovet, and ITC Foods hire veterinarians for product innovation.

3. Clinical Practice and advanced veterinary medicine

Beyond traditional practice, veterinarians can specialize in:

- Pet food nutritionist: Formulates breed-specific and therapeutic diets.
- Dairy herd health manager: Works with corporate farms to optimize milk production and quality.
- Wildlife product specialist: Engages in sustainable utilization of wildlife by-products (e.g., venison, ethical leather).

Global opportunities:

- Pet care chains (Mars Petcare, BluePearl Vet)
- Wildlife and exotic animal product industries (Zoos, conservation agencies)

4. One Health and regulatory careers in animal products

- Food Safety Officer: Ensures hygienic meat, milk, and egg production (FSSAI, USDA, EU Food Safety Authority).
- Zoonotic disease analyst: Works with WHO, OIE, and CDC on disease surveillance in animal-derived foods.

Recent trends and government initiatives in India

1. Digital transformation in livestock sector

- National Digital Livestock Mission (NDLM) – Tracks livestock health and productivity via digital IDs.
- e-NDDB App – Connects dairy farmers with markets and tech solutions.

2. Boosting meat and dairy exports

- India's meat exports (buffalo meat) rank among the top globally; opportunities in halal certification, cold chain logistics.
- Dairy sector growth – Amul and NDRI innovations in probiotic dairy, lactose-free milk.

3. Sustainable and alternative protein industries

- Lab-grown meat and insect protein startups gaining traction.
- Whey protein and casein extraction from milk for sports nutrition.

Conclusion

The scope of technology transfer in veterinary sciences is vast, spanning research, extension, clinical practice, and entrepreneurship. With increasing demand for value-added animal products, sustainable farming, and One Health integration, veterinarians have diverse career pathways in India and globally. This One-Day Workshop on “Career Development in Veterinary and Animal Sciences” aims to guide students and professionals in leveraging these opportunities—whether in R&D, food processing, digital agriculture, or regulatory roles. By embracing innovation, veterinarians can drive economic growth, ensure food security, and contribute to a healthier future.

Technology transfer and career opportunities in veterinary science

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Abstract

Veterinary Science deals with the treatment, well-being and maintenance of all animals. The under-graduate course is of five and half year duration with the master's and Ph.D. degree of minimum two and three years duration, respectively. The course is scattered in 17 departments and specialization can be done in any subject in the veterinary science. With advancement in technologies in this sector along with increasing consciousness and passion of the people towards animal well being and animal rights, veterinary science has become an area of choice among the youth. Several technologies are coming up every day in this sector related to feed, medicine, diagnostics, vaccines, cosmetic products etc. which has opened up the scope of transfer of technologies. Technologies related to animal health, livestock productivity, control of zoonotic diseases, veterinary education, sustainable practices, entrepreneurship and start-ups, companion animal medicine, antimicrobial resistance, wildlife health and conservation in national and international collaborations are developing continuously which has also opened up the job opportunities for the veterinarians in India. With the increasing contribution of the livestock sector in national economy, the market for pet care, biologicals, food products and other sectors in this field is booming day by day. As a consequence of these, the demand and diversified job opportunities have increased for the veterinarians. They can establish their career as officers in government and public sectors, may get involved in research and development activities, teaching and education. They can also opt for private practice in both large and small animals, get engaged in public health sector or in animal welfare, advocacy or consultancy. Veterinarians are now widely involved in development and marketing of pharmaceuticals, food products, diagnostics etc. They are also involved in zoo and wildlife sanctuaries, in defense services, in diagnostic laboratories etc. Further, veterinarians can also become successful entrepreneur. Therefore, there are immense scope in development and transfer of technologies in veterinary science and there is no dearth of opportunities for a knowledgeable, skillful and passionate veterinarian in India.

Introduction

Veterinary science is a science that deals with the treatment, well-being and maintenance of all animals. The course can be studied after (10+2) level by any youth who is passionate about animals and for their well-being. The course deals with all kinds of studies related to animals such as physiological analysis, preventive and clinical care, psychological analysis, surgical problems, and all other things that are related to the well-being of animals. Apart from academic excellence, this course also requires a lot of passion, zest and dedication for animals. There is different undergraduate, postgraduate, and PhD. programmes in Veterinary science courses are offered by different colleges/universities throughout India as B.V.Sc. & A.H., M.V.Sc. and Ph.D. The under-graduate course is presently of five and half year duration followed by M.V.Sc. for minimum 2 years and Ph.D. for minimum 3 years in India. The eligibility criteria for the candidates applying for UG courses are successful completion of (10+2) from any recognized board with subjects like physics, chemistry, and biology with a minimum aggregate of 55%, while the candidates applying for PG courses should have completed their B.V.Sc. from a recognized university or college with a minimum aggregate of 50%. The entrance exam for admission to the B.V.Sc. & A.H. course depends on the college but some of the common entrance exams for this

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course are NEET, State Joint Entrance Examination of separate entrance examination organized by respective universities. Whereas, admission in post-graduate and PH.D. programme is made through common entrance examination organized by ICAR or separate entrance examination organized by respective universities.

With the expanding horizons in veterinary science, several technologies are been developed which are related to animal health, production and well being. Technology transfer is a critical process in veterinary science, involving the application of research findings and innovations to practical and commercial uses. In India, with its rich agricultural heritage and diverse livestock population, technology transfer has immense potential to revolutionize veterinary and animal sciences. This process contributes not only to improving animal health and productivity but also to fostering career development opportunities for professionals in the field. The theme of “Career Development in Veterinary and Animal Sciences” aligns perfectly with the emerging trends and scopes of technology transfer in the Indian context. Because of increased consciousness among people about animal welfare and rights, the importance and demand of this course is increasing day by day. Realizing the involvement of veterinarian in different sectors, the job opportunities also have increased for the veterinarian in recent past in diversified fields.

Trends and scopes of technology transfer

1. Enhancing animal health in India

India faces unique challenges in animal health due to the diversity of its livestock species and the prevalence of infectious diseases. Technology transfer can address these issues by enabling the commercialization and dissemination of innovations such as:

- Affordable diagnostics: Point-of-care diagnostic tools tailored for India’s rural veterinary settings can significantly improve disease detection and control. Technology transfer facilitates partnerships between research institutions and manufacturers to produce cost-effective diagnostic kits.
- Indigenous vaccines: Developing and distributing vaccines for diseases prevalent in India, such as foot-and-mouth disease (FMD) and bluetongue, can reduce economic losses for farmers. Transfer of vaccine technology ensures wide accessibility, especially in remote areas.
- Therapeutics for local conditions: Research into herbal and traditional remedies can be commercialized into modern formulations, blending traditional knowledge with scientific innovation.

Veterinarians specializing in these technologies can pursue careers in pharmaceutical companies, government health programs, and diagnostic laboratories.

2. Boosting livestock productivity

Livestock plays a pivotal role in India’s agricultural economy. Technology transfer is crucial for introducing advanced practices and tools to enhance productivity, including:

- Reproductive biotechnologies: Techniques like artificial insemination, *in vitro* fertilization (IVF), and cloning are being adapted to suit India’s diverse livestock breeds. Veterinarians trained in these technologies have opportunities in breeding centers, research institutions, and private consultancy.
- Feed innovations: Nutritional supplements, fortified feed, and precision feeding systems tailored for Indian livestock can address malnutrition and boost production. Technology transfer ensures these innovations reach farmers through public-private partnerships.
- Health management systems: The adoption of wearable sensors and farm management software allows for real-time monitoring of livestock health, increasing efficiency and reducing losses.

These advancements open career paths in agribusiness, livestock consultancy, and veterinary extension services.

3. Controlling zoonotic diseases

India’s dense population and close human-animal interactions make zoonotic disease control a top priority. Technology transfer in this area focuses on:

- Integrated surveillance systems: Tools for monitoring zoonotic diseases like brucellosis, leptospirosis, and anthrax are essential for early detection and control.
- Collaborative research: Partnerships between veterinary and medical professionals foster the

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development of vaccines, diagnostic tools, and educational campaigns for zoonotic disease prevention.

Veterinarians involved in One Health initiatives can work with international organizations, public health agencies, and NGOs, contributing to national and global health security.

4. Revolutionizing veterinary education in India

Innovative teaching methods and tools are transforming veterinary education in India. Technology transfer plays a key role in:

- Simulation-based learning: Virtual and augmented reality tools offer hands-on training experiences for students, reducing dependency on live animals.
- E-learning platforms: Online courses and mobile apps provide accessible education to students in remote areas, bridging the gap between urban and rural veterinary institutions.

Veterinarians with expertise in educational technology can find roles in academia, content development, and educational software companies.

5. Promoting sustainable practices

Sustainability is an essential focus in India's veterinary and animal sciences. Technology transfer supports eco-friendly innovations such as:

- Waste management solutions: Biogas plants and composting technologies help manage livestock waste, reducing environmental impact while providing renewable energy.
- Sustainable fisheries: Innovations in aquaculture, such as water recirculation systems and disease-resistant fish breeds, enhance productivity while maintaining ecological balance.
- Climate-resilient livestock: Developing and disseminating climate-resilient breeds and adaptive management practices help farmers cope with climate change.

Veterinarians skilled in sustainability can pursue careers in environmental policy, agribusiness management, and international development projects.

6. Encouraging entrepreneurship and start-ups

India's vibrant start-up ecosystem offers immense potential for veterinary innovations. Technology transfer enables the establishment of:

- Telemedicine platforms: Mobile apps providing veterinary consultations and services are gaining traction in rural and urban areas.
- Biotechnology ventures: Start-ups focusing on diagnostics, vaccines, and biologics offer exciting opportunities for veterinarians with a research background.
- Equipment and tool manufacturing: Companies developing affordable and innovative veterinary tools require veterinary expertise for product design and testing.

Entrepreneurial veterinarians can establish their ventures or collaborate with start-ups to bring innovative solutions to market.

7. Strengthening international collaborations

India's veterinary science sector benefits from global partnerships facilitated by technology transfer. Key areas include:

- Export of veterinary products: Indian-made vaccines, diagnostics, and therapeutics are increasingly being exported, creating new markets and job opportunities.
- Collaborative research: Indian veterinarians participating in multinational projects gain exposure to advanced technologies and methodologies.

Veterinarians engaged in international collaborations can work in global organizations, multinational companies, or government agencies.

8. Advancing companion animal medicine

The growing demand for pet care in India has opened avenues for technology transfer in:

- Diagnostics and imaging: Advanced tools like digital X-rays, ultrasounds, and CT scans improve the quality of care for companion animals.

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- Therapeutic innovations: Technologies like stem cell therapy and personalized medicine are making inroads into pet healthcare.
- Pet wearables: Devices for tracking health parameters in pets are gaining popularity among urban pet owners.

Veterinarians specializing in companion animal medicine can expand their careers in private practice, pet care chains, and diagnostics companies.

9. Addressing Antimicrobial Resistance (AMR)

India's battle against AMR is bolstered by technology transfer in:

- Alternative therapies: Innovations like phage therapy and probiotics offer solutions to reduce antibiotic dependency.
- Monitoring tools: Software and platforms to track antimicrobial use in livestock ensure responsible practices.

Veterinarians focused on AMR can contribute to policy development, research, and awareness programs at national and international levels.

10. Supporting wildlife health and conservation

India's rich biodiversity necessitates veterinary involvement in wildlife conservation. Technology transfer aids in:

- Disease management in wildlife: Vaccines and treatments for diseases affecting endangered species ensure the health of wildlife populations.
- Conservation technologies: Tools like GPS tracking and drone surveillance enhance monitoring and management efforts.

Veterinarians specializing in wildlife health can collaborate with conservation organizations, zoos, and government agencies.

Statistics in animal health care sector

- The veterinary profession in India is experiencing significant growth which is mostly driven by increasing pet ownership and a heightened focus on animal health. Livestock is a very crucial part of the Indian economy as it contributes greatly to the socio-economic well-being of the country as well as food and nutritional security to the people. Livestock sectors almost contribute to 4.5% of the country's economy. Also, around 16.44 million people are directly working in this sector in India.
- The Indian veterinary healthcare market valued approximately at USD 1,169.8 million in 2021 which is predicted to reach almost up to USD 1,856.3 million by 2027 with a CAGR of more than 7.70%.
- As of 2023, the Indian veterinary medicine market was also valued at approximately USD 1.80 billion and it is projected to expand at a compound annual growth rate (CAGR) of 10.3%, reaching to an estimated USD 3.55 billion by 2030.
- This expansion of the market is accompanied by an increase in demand for veterinary professionals. In the first half of 2023, there was a 10-15% increase in the demand for veterinarians compared to the same period in the previous year. Specializations in small animal care, surgery, pathology, and alternative therapies are gaining prominence which reflects the evolving needs of this industry.
- The Indian Animal Health Industry has been growing immensely and has been observed to be around INR 7000 Crore and more than 50 companies are operating in this sector.
- Indian pet care has become the fastest-growing marketplace in India and there has been an increase in the number of pet parents who adopt different animals. This has eventually led to an increase in veterinary clinics as well as hospitals being established and required by these pet parents.
- Regarding compensation, salaries for veterinarians in India vary based on experience, location, and specialization. According to Pay Scale, the average annual salary for a veterinarian in India is Rs. 750,000, with a typical range between Rs. 345,000 and Rs. 2,000,000.
- The World Organization for Animal Health reports that India currently has over 25,000 veterinarians, indicating a substantial workforce. However, with the sector's growth, there remains room for expansion in veterinary services to meet the increasing demand.

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All this data shows how the veterinary sector in India is growing at pace and has led to the creation of job opportunities for passionate and dedicated individuals who want to establish their careers in this. India offers promising career opportunities, supported by a growing market and competitive salaries. Prospective veterinarians can explore diverse roles in clinical practice, research, and various animal health sectors, contributing significantly to animal welfare and public health. There are a lot of private as well as government sectors that offer jobs for veterinary graduates and postgraduates as veterinarians, animal physiologists, etc.

Diversified career opportunities

In India, the career opportunities for a veterinarian are expanding day by day due to the growing importance of animal health, public health, and the increasing demand for veterinary services. Below are some common career paths that a veterinarian can opt for:

1. Officers in government and public sector

This basis requirement is B.V.Sc. & A.H. degree. Though, post graduate specialization in any particular subject is preferred in some of the specialized sectors.

- **Veterinary officers in government:** Veterinarians are mostly employed by all the state and central government departments, including the Department of Animal Husbandry, Dairying and Fisheries in different capacities. To take care and monitor the livestock health management, disease control, and food safety in field level.
- **Veterinary surgeon in government hospitals:** The state governments employ veterinarians as surgeons and veterinary officers in government veterinary hospitals, especially in rural areas to provide health care facilities to the animals.
- **Indian Veterinary Service (IVS):** It is a prestigious career option in which veterinarians can be recruited into the civil services under the Indian Administrative Service (IAS) but in a specialized veterinary role. This involves administrative work, policy planning, and implementation in the field of animal husbandry and veterinary science.
- **Animal health inspectors:** Veterinarians often work in government bodies, such as the Food Safety and Standards Authority of India (FSSAI), to ensure the standard of animal products and also to maintain the food hygiene.

2. Research and Development

The basic requirement is post-graduation in particular subject. The Ph.D. degree holders are preferred in some cases.

- **Research institutions:** Veterinarians can work in various government institutions under ICAR/ICMR/DBT/DST etc. as research scientists and also in various agricultural universities, conducting research in animal health, disease prevention, animal production and reproduction etc.
- **Pharmaceutical companies:** India has a growing pharmaceutical industry focused on animal health and veterinary biological where veterinarians contribute to the development of vaccines, medicines, and diagnostic tools.
- **Biotechnology firms:** Veterinarians are also involved in research and development wings of different companies for development advanced biotechnological solutions for veterinary care and animal breeding.

3. Teaching and education

The basic requirement is post-graduation in particular subject. The Ph.D. degree holders are preferred.

- **Veterinary colleges and universities:** Veterinarians with post-graduation degree in a particular subject can pursue teaching careers in veterinary colleges across India as Assistant Professor. Institutes like the Indian Veterinary Research Institute (IVRI), and several agricultural universities both government and private appoint veterinarians as faculty members.
- **Training and workshops:** Some of the veterinarians also run workshops, training sessions, and certification courses for aspiring veterinarians or people working in animal husbandry sector.

4. Private Practice

This basis requirement is B.V.Sc. & A.H. degree. Though, post graduate specialization in any particular

subject also can practice with special emphasis on the field of specialization.

- **Small animal clinics:** Veterinarians can set up or join in small animal clinics that to provide medical care to pets like dogs, cats, birds, or any other species of animals. Mostly in urban areas.
- **Large animal practice:** In rural areas, veterinarians can focus on large animal care, providing services to cattle, buffaloes, horses, and other livestock.
- **Mixed animal practice:** This is common in both rural and urban areas, where veterinarians treat both small and large animals.

5. Veterinary public health

The basic requirement is post-graduation in subjects like public health, epidemiology, medicine, microbiology, pathology etc. The Ph.D. degree holders are preferred.

- **Epidemiology and disease control:** Veterinarians have their job in prevention and control of the outbreak of diseases in the animal population and also work towards eradicating of such diseases. This job profile comes under the veterinary public health section as it is concerned about humans and the environment as well. Veterinarians also play an essential role in the monitoring and control of zoonotic diseases (diseases transmitted from animals to humans) like rabies, avian influenza, and foot-and-mouth disease, through public health programs.
- **Food safety and inspection:** As food safety officers or in the **Food Safety and Standards Authority of India (FSSAI)**, veterinarians help to ensure the quality and safety of animal-based food products like milk, meat, and eggs.

6. Animal welfare and advocacy

This basis requirement is B.V.Sc. & A.H. degree. Though, post graduate specialization in any particular subject also can practice with special emphasis on the field of specialization.

- **Animal shelters and NGOs:** Veterinarians can work in animal welfare organizations, animal shelters, and also in animal rescue operations. This includes working with NGOs involved in animal rights and welfare like the People for Animals (PFA), Blue Cross of India etc.
- **Animal rights advocacy:** Veterinarians can also play role in advocating for stringent animal protection laws and work on prevention of cruelty to animals.

7. Veterinary consultancy and advisory

This basis requirement is B.V.Sc. & A.H. degree. Though, post graduate specialization in any particular subject also can practice with special emphasis on the field of specialization.

- **Farm animal consultancy:** Veterinarians can offer consultancy services to farmers on improving livestock health, nutrition, breeding, and disease management in medium to big size farms.
- **Pet care consultancy:** The number of pet owners are increasing day by day in India, veterinarians also can offer consultancy services to pet owners on proper pet nutrition, health, breeding and disease prevention and control measures.

8. Corporate and industry roles

The basic requirement is post-graduation in subjects like nutrition, pharmacology, medicine, microbiology, pathology, biochemistry etc. The Ph.D. degree holders are preferred.

- **Pet food and pharmaceutical sales:** Veterinarians can have a vital role in promotion, popularization and sell of pet food, pharmaceuticals, or veterinary products and also providing expert advice by working in the producing companies.
- **Product development:** Veterinarians in the corporate sector provides valuable inputs in the development of new veterinary medicines, diagnostic kits, vaccines, and medical equipment.

9. Zoo and wildlife medicine

This basis requirement is B.V.Sc. & A.H. degree. Though, post graduate specialization in medicine, livestock production management etc. are preferred.

- **Zoo veterinarian:** Veterinarians are needed in many zoos, wildlife sanctuaries, and national parks in India to treat, manage and care for exotic and endangered wild species. Institutions like the

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Zoological Survey of India and **Wildlife Institute of India** offer such career opportunities to the veterinarians.

- **Wildlife conservation:** Veterinarians play a crucial role in wildlife conservation by providing clinical care and management to the wild animals and in collaboration with environmental agencies ensures the sustainability and species survival.

10. Veterinary journalism

- **Veterinary publications and media:** Veterinarians can run or act as editors of different veterinary journals and contribute to the growing field of animal care journalism also by writing for veterinary journals, pet magazines, or websites. They may also deliver talks on TV or radio shows on animal healthcare and management practices.

11. Defense Services

- **Veterinary officer in the Indian Army:** Veterinarians can work in the Indian Army or Border Security Force (BSF) for taking care of the health and management of working animals like dogs, horses, and mules.
- **National Disaster Response Force (NDRF):** Veterinarians can also work with NDRF teams that respond to natural disasters for providing medical care to animals affected by natural calamities such as flood, storm etc.

12. International opportunities

- **Foreign organizations and NGOs:** Veterinarians may work on global public health issues, disease control, and animal welfare with international organizations such as the **World Health Organization (WHO)**, **Food and Agriculture Organization (FAO)**, or **World Animal Protection** etc.

13. Veterinary pathology and diagnostics

- **Laboratories and diagnostics:** Veterinarians with specialization in subjects like pathology, microbiology, parasitology, biochemistry etc may work in veterinary diagnostic laboratories, conducting tests and autopsies to diagnose animal diseases.
- **Forensic veterinary science:** Veterinarians specialized in forensic pathology can work in forensic science institutions to investigate animal abuse, poisoning, or accidents in legal cases.

14. Entrepreneurship

- **Starting veterinary clinics or animal hospitals:** With the increasing demand for veterinary services and animal products in India, veterinarians can act as entrepreneur by establishing his/ her own clinics/ hospitals/ farms/ food processing units etc.
- **Pet care industry:** Veterinarians can also engage themselves in the business of pet grooming, boarding, and training.

Conclusion

The scopes of technology transfer in veterinary science in India are vast and diverse, addressing challenges in animal health, productivity, sustainability, and zoonotic disease control. These advancements not only contribute to the growth of the veterinary sector but also create dynamic career opportunities for professionals. By embracing the potential of technology transfer, Indian veterinarians can drive innovation, improve livelihoods, and establish themselves as leaders in veterinary and animal sciences. With the increase consciousness towards animal welfare and rights and with the growing contribution of the veterinary sector in the national economy, the importance and demand of the veterinarians have been felt by all the stakeholders. Further, with recent outbreak of infectious and zoonotic diseases has also increased the importance of proper care and management of the animal population of the country to ensure human health and food safety and security. Therefore, veterinary professionals in India have diverse career options across various sectors, including government services, research, education, animal welfare, and the booming pet care industry. The increasing recognition of the importance of animal health and welfare is driving demand for skilled veterinarians, creating numerous opportunities for growth and specialization. With the advent of newer technologies and their application in veterinary sciences, the unconventional job opportunities are also opening. Thus, veterinarians with sound knowledge and skill are asset to the society and can fancy their chances in numerous sectors.

Private practice as career opportunity for veterinary graduates- An overview

Subir Bhattacharya

Small Animals Practitioner

'Open Sesame', perhaps, is the nearest right word to describe the state of mind that a veterinary graduate encounters when obtaining a Bachelor's degree in veterinary medicine from the University, as almost endless varieties of opportunities are opened before the new students.

As a dynamic branch of science, the field of veterinary medicine is constantly changing with every passing day, and many youths are getting attracted to it as it offers various choices.

Veterinarians are invited as state guests on occasions like the wedding ceremony of Anant Ambani and Radhika Merchant, reportedly one of the most expensive marriage events Indian people have ever seen that costs an estimated amount of 600 million USD.

Social status apart, Dr. Martin Fettman, a veterinarian was sent to space by National Aeronautics and Space Administration in an outer Space mission aboard Space Shuttle Columbia in 1993 assigned as STS-107.

James Herriot went on writing Yorkshire Dales worth 60 million copies as a British writer, Veterinarian, etc.

Hence, veterinarians are open to choosing to follow conventional routes or a multitude of other alternative paths, and all are employed in some form or another.

Veterinary medicine is a big world full of many possibilities, from clinical practice to laboratory work, from public health to academia, and so on and so forth.

In this Magnanimous Sea, one must know what he or she is passionate about and match that to the practice type that best fits it.

Private practice

A ride on a Time Machine goes back to 1832 when the first veterinary college was established at Lahore, Erstwhile undivided India, or in 1761 when the first veterinary institute was formed in Lyon, France. Veterinary art was on its way to experiencing a metamorphosis, and Veterinary science sprung into being. The first few batches produced the practitioner surgeons only to cater to the treatment needs of the world and, later, in India. Thus, clinical practice is the most primitive yet the most time-tested profession that veterinarians could ever have.

In society in general, when the common masses think of veterinary medicine, the first thing that arises is the picture of someone who treats domestic animals of any sort, be it a dog, a cat, a cow or a bird or animals of any sort matching the geographical distributions. That is a petty look, but in all practical senses, no such terminology ever existed to undermine a Veterinary Doctor as a simple practitioner. The doctors engage themselves in practicing all kinds of skills of medicine and surgery on all the domesticated species from general check-ups to late-night emergencies, major surgeries to preventive vaccinations, etc.

Private practice exists in all forms and figures, and involved Veterinary Doctors also shape themselves to become pertinent to it.

It can be clinic-based or Individual Freelancing types. A clinic may be as big as a Multispeciality hospital, accommodating many veterinarians, nursing staff, front desk assistants and public relations officers with

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various diagnostic facilities and state-of-the-art operation theatres with modern equipment to single and lone man army type veterinary facilities in less populated areas like villages.

Busy vets need the use of technology like X-ray ultrasound, PET CT, etc., while relatively less equipped vets may prefer to practice alone and take advantage of referral clinics in case of emergencies. Large cities can accommodate more of the organised practice, but in rural places, the single vet concept can still thrive.

The most interesting part of private practice, which sounds lucrative too, is the money part. Many vets own their individual practice and plan according to the footfall, develop facilities, engage more time and prepare professional frameworks to attract clients who, either on their entry or on exit, leave positive feedback and encourage the practitioners to excel more.

On the contrary, some veterinary doctors prefer not to deal with the commercial side and join as a helping hand to salaried persons with limited conditions.

With the change in social structures and people's moods, private practice has also taken different forms.

One such is the companion animal practice. It covers everything and every possible animal, be it domestic or exotic. All can be pets, turtles, rabbits, hamsters to name a few. This field is very intriguing and involves a lot more time and work, from nutrition to consultation, cosmetics to grooming, performing small to big surgeries, selling medicines, and providing logistics.

The ever-increasing demand for private practice is skyrocketing and giving rise to the need for specializations.

Universities are now offering residency programmes spanning upto two years in different fields, namely, anaesthesia, ophthalmology, emergency and critical care, diagnostic imaging, soft tissue surgery, orthopedics, oncology and dermatology etc. The idea is to educate the practitioners at the advanced levels to cater to their needs. The newly educated veterinarians are jumping into the practicing arenas and earning social prestige to manifolds.

In metro cities and big towns, they form practitioners' forums and engage in continuing education programmes and hands-on training with choice mentors in specified fields.

Some are going to the extent of shared practice, even to the extent of radiation therapies. The concepts are very encouraging and unique indeed!

One cannot do everything alone, but together, everything could be done.

Gradually, private practitioners have started carrying sound social values. They are educators. Their role in the public health sector is tremendous. Without them, a rabies-free world is a far cry. Pet neutering and spaying are helping the population control stray dogs. Many clinics are now running Senior wellness programme and are very keen on executing their roles as Public Health Ambassadors.

The world of private practice is soaring high. Practitioners all over the world are assembling together to discuss global advances and exchange their views. Almost all areas are now familiar to the vets in meets.

As a medico technical graduate, a veterinarian now is a global entity and demands similar social prestige at par with counter professionals. In the family and in the society, a veterinary practitioner is an established persona grata and an integral part of the broader perspectives of veterinary fraternity.

In conclusion, amidst many diverging choices, a veterinarian cannot feel less proud of adopting the role of a private practitioner as a career goal as he or she not only will take care of financial well-being but also will get ample opportunity to make the best use of time with Morale kept high engaging with the Mute world presented before them.

"If having a soul means being able to feel love and loyalty and gratitude, then animals are better off than a lot of Humans", said James Herriot.

Honesty thus pays dividends to the practicing vets the world over!

Veterinarians of today and all of tomorrow join the practice to make the world a better place for the mute animals to live on earth!

Session 2

Skill Development

Focused training on:

Soft Skills: Communication and networking (Interaction with professionals), AI based advancement, ICT etc

Technical Skills: Emerging tools and technologies in Veterinary and Animal Sciences

Career development in veterinary and animal sciences: Opportunities and growth strategies

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From traditional roles in academia and research to cutting-edge careers in biotechnology and digital health solutions, the veterinary profession is constantly expanding. Precision livestock farming and climate-resilient breeding not only address current challenges like food security and climate change but also create meaningful career opportunities that contribute to global well-being.

Experts in this domain are truly shaping the future of animal health, welfare, and sustainable agriculture. Whether it's advancing scientific discoveries, influencing policies, developing innovative technologies, or establishing entrepreneurial ventures, the possibilities are vast and transformative.

A. Key career opportunities

- **Academia and research:** The Veterinary Profession offers numerous opportunities for faculty and research positions in universities, veterinary colleges, and research institutes such as ICAR (Indian Council of Agricultural Research), CSIR (Council of Scientific and Industrial Research), and DBT (Department of Biotechnology). Opportunities also exist for specialization in genetics, breeding, nutrition, disease control, and animal biotechnology.

The emerging field of animal biotechnology and artificial intelligence opens doors for innovative research and applications in the field of veterinary sciences. For those looking to expand their horizons, postdoctoral fellowships and international research collaborations provide a platform to work with global experts and gain exposure to cutting-edge techniques and knowledge.

- **Government services:** Major opportunities in the profession are job opportunities as Veterinary officers in Animal Husbandry Departments of different states which play a crucial role in disease control, implementing breeding schemes, and enforcing policies. There are several positions in regulatory bodies such as Food Safety and Standards Authority of India (FSSAI), National Bank for Agriculture and Rural Development (NABARD), Indian Council of Agricultural Research (ICAR), Department of Animal Husbandry and Dairying (DAH&D) and the Livestock Development Boards.

Moreover, veterinarians contribute significantly to public health by tackling zoonotic diseases that can spread between animals and humans. Their involvement in One Health programs—which integrate human, animal, and environmental health—addresses global challenges like pandemics and antimicrobial resistance.

- **Private sector and industry:** The veterinary profession continues to expand into many industries, offering exceptional opportunities. The pharmaceuticals sector, for example, provides roles in research, development, and quality assurance for medicines and vaccines tailored to animal health. Dairy, poultry, meat processing, and animal feed industries rely on veterinary professionals to optimize production, ensure safety standards, and enhance the welfare of animals within these systems. Corporate livestock management and agribusiness consulting are exciting fields for those looking to merge technical expertise with strategic leadership. Product development roles allow for innovation in animal care products, nutritional supplements, and more.

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With the rise in pet ownership globally, the companion animal health industry is booming. Professionals specializing in pet nutrition, grooming, and overall animal welfare have growing opportunities. Animal welfare organizations also present rewarding careers for those passionate about advocating for humane treatment and ethical practices.

- **Entrepreneurship and agri-startups:** Entrepreneurship in the veterinary field is full of potential. Establishing clinics, diagnostic labs, breeding centers, and AI (Artificial Insemination) stations not only fulfills a critical need but also allows professionals to shape their businesses with innovative ideas. These ventures are essential for ensuring high-quality care, advancing animal reproduction techniques, and improving overall livestock management.

Organic farming, dairy farming, goat farming, and aquaculture businesses are growing rapidly, driven by increased demand for sustainable and ethical farming practices. These industries offer immense scope for creative approaches, such as branding organic animal products or enhancing farming methodologies.

Emerging agribusiness trends—like mobile veterinary services, digital platforms for animal health monitoring, and precision dairy farming—are transforming new-generation animal husbandry concepts.

- **International careers:** There are career opportunities in global organizations such as Food and Agriculture Organization of the United Nations (FAO), Office *International des Epizooties* (OIE)/ World Organisation for Animal Health (WOAH), World Health Organization (WHO), and multinational agri-based firms.

Recently, there are several project-based and research-oriented positions in climate-resilient cattle husbandry, precision agriculture and sustainable food production in different developed and developing countries.

- **Skill-based specializations:** Practical training in embryo transfer, artificial insemination, ultrasonography, and genetic improvement methods empowers professionals to revolutionize animal breeding and productivity. These techniques pave the way for higher efficiency and sustainability in livestock management.

The integration of emerging technologies is transformative. Blockchain for livestock traceability ensures transparency and trust in food systems, while AI (artificial intelligence)-assisted health monitoring allows for early detection of diseases and personalized care. Automated dairy farming systems optimize operations, reduce labour-intensive processes, and enhance production.

Further, the emergence of forensic veterinary sciences opens doors to unique roles in solving cases involving animal abuse, health disputes, or wildlife crimes. Legal consultancy services in animal welfare advocate for stronger laws and ethical practices, providing an avenue for impactful work. Green livestock production, focusing on eco-friendly methods, is gaining momentum in developed countries to combat environmental challenges and promote sustainability.

B. Advancing career development for strategic growth

The field of Veterinary and Animal Sciences is rapidly evolving, offering diverse career opportunities in academia, research, industry, government services, and entrepreneurship. Advancements in biotechnology, precision livestock farming, digital health solutions, and sustainable animal husbandry have expanded the career landscape, making continuous learning and skill development essential for success.

- **Higher education and specialization:** Pursuing advanced degrees (M.V.Sc., Ph.D.) in any field of veterinary sciences along with enrolling in specialized training programs to enhance expertise in emerging technologies and sustainable livestock management and precision farming. Such expertise not only sets professionals apart but also equips them to tackle global challenges in food security and climate change with impactful solutions.
- **Skill development and certifications:** Students in the Veterinary Profession can gain hands-on experience in embryo transfer, artificial insemination, ultrasonography, and genetic improvement programme. These

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techniques enable precise interventions that improve genetic quality, enhance productivity, and contribute to sustainable practices. Complementing this hands-on training with professional certifications in specialized fields such as disease diagnostics, precision animal nutrition, and animal welfare further enhances their skill set and opens up a broader range of career opportunities.

- **Industry and international exposure:** Professional students should be exposed to different industries of pharmaceuticals, dairy, poultry, meat processing, and biotechnology sectors to gain hands-on experience for development of practical knowledge, skills and aptitude. International exposures to recent research areas of the sector along with scientific development can give a potent boost to the carrier of the students in the profession.
- **Collaborations and networking:** Active participating in scientific conferences, seminars, workshops, and veterinary associations; interacting with scientific societies, industry linkages can expose the professionals in recent developments in the sector. Collaboration with experts and policymakers contributing to animal health, welfare, and sustainable livestock production can also increase the network and knowledge of the students.

Conclusion

The science of Veterinary and Animal Sciences is constantly changing, and the professionals in this field are given enormous chances to contribute towards food security, sustainable animal husbandry, animal welfare, and global health. Through staying informed with technological progress and business trends, professionals can establish a prosperous and rewarding career in this area.

Career development in veterinary pathology in India

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Veterinary pathology is a specialized para-clinical discipline in Veterinary Science that focuses on the study of diseases in animals. It involves understanding the causes, mechanisms, and effects of diseases in affected animals. Veterinary pathologists play a crucial role in diagnosing diseases, guiding treatment, and conducting research to improve animal health. Veterinary pathology can be divided into two major core areas 1) Clinical pathology that deals study of body fluids (e.g., blood, urine) and cells (e.g., cytology) to generate diagnostic information and understand disease and 2) Anatomical pathology that deals study of changes in the structure of tissues and organs caused by disease (e.g., necropsy and histopathology). The primary aims of the subject are to

- Identify the causes of animal diseases.
- Understand the progression of diseases.
- Provide diagnostic information that guides clinical decision-making.
- Contribute to disease prevention, control, and treatment through research.

2. Key roles of veterinary pathologists

Veterinary pathologists have several key roles within the field of veterinary medicine and animal welfare such as:

a. Disease diagnosis

One of the primary roles is diagnosis of diseases through various diagnostic techniques like:

- **Necropsy (Post-mortem examination):** Conducting a thorough examination of a deceased animal's body to determine the cause of death and give PM diagnosis. This is especially important in cases of unexplained deaths, zoonotic disease surveillance, or legal investigations of livestock, poultry and wild animals.
- **Histopathology:** Examination of tissue samples under the microscope to identify disease-causing changes in the cells and tissues. It is used for identifying infections, cancers, inflammation, and organ damage. Besides, immunohistochemistry is very much useful techniques of diagnosis by demonstrating antigen in tissues.
- **Cytology:** The study of cells from body fluids or aspirates, which helps in diagnosing infections, cancers, and inflammatory conditions.

b. Research

Veterinary pathologists play a significant role in scientific research, helping to advance knowledge in veterinary science. This includes:

- **Pathogenesis and pathogenicity study:** Understanding how pathogens (bacteria, viruses, parasites) cause disease and damage tissues. The research on pathogenesis and pathogenicity studies in host and

experimental model are crucial for developing vaccines, anti-microbial agents in order to disease prevention and control.

- **Development of diagnostic tools:** Conducting research to develop and refine techniques for diagnosing diseases of livestock and poultry in more accurately and efficiently.
- **Drug development and safety study:** The discipline put more emphasis in collaboration with pharmaceutical and biotechnology companies to develop drugs or anticancer therapy as well as their safety study.

c. Education and skill development

Veterinary pathologists also have a vital role in educating veterinary students, interns, and residents. They teach the principles of disease mechanisms, pathology techniques, and diagnostic approaches. They may also provide continuing education for practicing veterinarians, enabling them to stay up-to-date with advances in diagnostic methods and treatment options.

d. Disease surveillance and control

Veterinary pathologists are often involved in monitoring animal populations for emerging diseases, particularly zoonotic diseases. They work with governmental and international organizations to help prevent outbreaks, track the spread of diseases, and control epidemics.

- **Epidemiology:** They study the patterns of disease occurrence and spread within populations to predict and prevent outbreaks.
- **Outbreak investigation:** During outbreak, veterinary pathologists provide essential diagnostic information that informs control measures, such as quarantine, vaccination.

e. Forensic investigations

In cases of suspected animal abuse or legal disputes, veterinary pathologists conduct forensic investigations to determine the cause of injury or death. They perform necropsies to collect evidence that can be used in legal proceedings, such as animal cruelty cases.

3. Veterinary pathologists in various settings

Veterinary pathologists are engaged in a variety of settings:

- **Private Veterinary Practices:** Pathologists often collaborate with veterinarians to diagnose difficult cases and help manage diseases in pets.
- **Animal Hospitals and Research Institutions:** Pathologists conduct research and diagnostic testing for specialized animal health concerns.
- **Government and Regulatory Agencies:** Veterinary pathologists work with governmental bodies like the Centers for Disease Control (CDC), the U.S. Department of Agriculture (USDA), and the World Health Organization (WHO) to monitor and manage animal health and zoonotic disease threats.

4. Career opportunity of completing MVSc and PhD in Veterinary Pathology in India

a. Academic careers (Teaching and Research)

- **Professor or lecturer in veterinary pathology:** With MVSc and PhD degree, you would be well-qualified to teach students in veterinary college or universities as Assistant/ Associate Professor or Professor.
- As a researcher, you can lead independent studies, working on animal disease prevention, zoonoses, or innovations in veterinary diagnostics and treatment. You may start career as Scientist (ARS) under ICAR, CSIR, ICMR. Many veterinary pathologists in academia work on translational research that bridges clinical practice with cutting-edge scientific discoveries.

b. Veterinary diagnostic laboratories

- **Chief veterinary pathologist:** You could work in or lead a veterinary diagnostic laboratory, interpreting tissue samples from animals and providing critical diagnostic information to veterinarians and other professionals. As a PhD holder, you may also oversee the research and development of new diagnostic techniques or assays.
- **Laboratory director:** Many diagnostic labs, especially those in university settings or large animal hospitals, require a veterinary pathologist to manage the laboratory and supervise research and clinical diagnostics.

c. Pharmaceutical or biotech industry

- **Drug development and toxicology:** Working in the pharmaceutical industry, you may contribute to the development of drugs and vaccines for animals. Higher academic qualification can be especially valuable in understanding the molecular and cellular aspects of diseases, which can aid in the development of therapeutics.
- **Regulatory affairs specialist:** In the biotech and pharmaceutical industries, regulatory affairs professionals ensure that drugs and vaccines meet the necessary standards for animal safety and efficacy. With a PhD, you may lead efforts to meet these regulations and guidelines.
- **Veterinary pathology researcher:** Conduct pre-clinical research and toxicology studies on new drugs or treatments for animals, working closely with scientists in other areas of biomedical research.

d. Government and public health sector

- **Government agencies:** You could work for government bodies such as the Centers for Disease Control and Prevention (CDC), U.S. Department of Agriculture (USDA), or World Health Organization (WHO), focusing on animal disease outbreaks, public health, and zoonotic diseases. Your expertise in veterinary pathology could be crucial in epidemiological studies or in monitoring and controlling infectious diseases.
- **Veterinary pathologist for regulatory agencies:** In this role, you'd assist with ensuring the quality control and safety of the food supply, particularly through surveillance of livestock health and the detection of animal diseases that may affect public health.

e. Private veterinary practice

- **Consultation and advisory service:** Veterinary pathologists may provide consultancy for histopathological interpretation and cancer diagnosis to clinicians, hospitals with the help of soft skills like communication, AI tools. Veterinary Pathologists can join as research scientist in R&D sector of various Poultry/ livestock companies.
- **Specialized veterinary practice:** Veterinary pathologists also can work alongside clinicians in specialized veterinary practices, such as cancer treatment centers, where you might focus on diagnosing tumors and offering pathology reports to guide treatment plans.
- **Private pathology labs:** You could start or work for a private pathology lab, offering specialized pathology services, clinical pathology laboratories and conducting clinical research to improve diagnostics in veterinary medicine.

f. International health and zoonotic disease

- **Zoonotic disease specialist:** With a PhD in Veterinary Pathology, you could become an expert in diseases that affect both animals and humans. Working with international organizations, such as the WHO or Food and Agriculture Organization (FAO), you may be involved in surveillance and prevention of zoonotic outbreaks.

- **Wildlife disease management:** Wildlife health management and research on emerging infectious diseases in wildlife populations is another avenue for veterinary pathologists. Understanding wildlife diseases and their potential impact on both wildlife conservation and human health can open up global career opportunities.

g. Veterinary forensics

In this role, you would investigate animal deaths for legal purposes. Veterinary forensic pathologists play a key role in criminal cases related to animal abuse, euthanasia protocols, or wildlife management. You would conduct necropsies to gather evidence for legal proceedings.

Additional skills

While you may already have a wealth of knowledge with an MVSc and PhD, these additional soft/technical skills can be beneficial in expanding your career

- **Leadership skills:** If you're in a leadership role, developing management and leadership abilities will help you direct teams and manage projects effectively.
- **Grant writing and fund tapping:** If you're involved in research, being able to secure funding through grant writing can be important, especially in academic or independent research settings.
- **Digital pathology:** Pathologists can explore the scope of digital pathology in tele-consultancy, academics and research. With the use of AI tools, digital pathology makes it possible for veterinary research and diagnostic applications to use effective high throughput imaging.

Skill development of veterinary graduates

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Veterinary graduates are the doctors of animal world. They are involved in raising, treatment and welfare of wide range of domestic, wild & captive animals and poultry. Veterinary graduates need to develop a wide range of skills to succeed in their careers, as they must be prepared to handle various animals, diagnose and treat illnesses, and work in diverse environments. Some of the key skills that veterinary graduates should develop include:

Leadership qualities

Effective planning involves creating a clear roadmap or strategy that outlines the steps needed to achieve a specific goal or outcome. It requires a visible direction, efficient resource management, and adherence to a set timeline. However, the success of executing this plan depends not only on the strategy itself but also on one's ability to remain calm and composed in the face of delays, difficulties, or setbacks. This patience is crucial for long-term success, as most goals require time and effort to realize.

Challenges, setbacks, and even failures are inevitable on the path to success, and it is during these times that persistence becomes key. The ability to keep moving forward, despite obstacles, is what separates successful execution from abandonment of the plan. Along this journey, negativity can often creep into our minds, hindering us physically, psychologically, and emotionally, and if left unchecked, can lead to failure.

To combat this, it is essential to maintain a positive mindset. Viewing challenges as opportunities for growth rather than insurmountable problems is essential for continued progress. Positivity fuels persistence, helps overcome mental barriers, and keeps the focus on the end goal, ultimately ensuring that the plan is carried out successfully.

Role of 5 D's in our life

A **dream** is not just something we experience in our sleep but rather a vision we hold in our conscious mind—a clear picture of where we want to be in the future. Whether the dream is short-term or long-term, reaching that destination requires unwavering **determination**. We must be committed to pushing forward, even when the journey gets tough. This determination and the “never give up” attitude are essential for success. One example of this persistence is the story of Robert the Bruce, who, after watching a spider tirelessly try and fail to build its web, decided to keep trying, no matter the obstacles. This anecdote serves as a powerful reminder that we must keep pushing forward, even after setbacks, until we reach our goal. Next comes **dedication**—the commitment to a task with single-minded focus. Nothing should distract or divert our attention from our purpose. It's this kind of unwavering dedication that fuels progress and keeps us on course. **Discipline** is also crucial. It's about self-control and the ability to follow rules you've set for yourself. Once you've defined your target, plan, or path, discipline means sticking to it through thick and thin, no matter the challenges. The phrase “come rain or shine, the soldiers march on” perfectly illustrates this principle of discipline. Finally, **direction** is key. It's not just about knowing what you want to achieve but also understanding the path or course to get there. This direction shapes how you manage yourself, your team, and

your resources. Keep your direction clear and always work towards refining and completing it, ensuring you're moving steadily forward.

Qualities of a good researcher

1. **Curiosity:** A curious mind and an ability to look at things from different perspectives is what makes a good researcher better. Good researchers are observant about the world around them and open to new ideas and possibilities; they are always asking questions and looking for answers.
2. **Critical thinking:** Successful researchers can think critically about the information they gather while reading about new developments in their own and related fields. This is an essential characteristic of a good researcher. Instead of simply accepting existing knowledge as fact, you need to have the ability to analyse and evaluate the validity and reliability of sources, consider alternative explanations for results you observe, and apply in real life for humankind.
3. **Creativity:** The qualities of a good researcher do not just include curiosity and critical thinking, but also thinking creatively when it comes to problem solving. Nurturing the ability to think outside the box and come up with novel and often unconventional solutions to challenges you face is how to become a better researcher. This allows you to come up with more ground-breaking research studies and results addressing issues that others might easily miss.
4. **Collaborative spirit:** An important characteristic of a good researcher is being able to work well with others. With a shift toward more collaborative research, successful researchers often connect with and work with peers to come up with innovative approaches to research problems. While sharing ideas and partnering with other researchers can lead to breakthroughs and boost your researcher reputation, it also opens the door for your work to reach and potentially benefit a wider audience.
5. **Communication skills:** An added strength of a good researcher is being able to communicate your findings clearly and effectively, which is a key contributor to your success. This is applicable when writing your manuscripts, presenting at conferences, as well as when seeking funding for your work. Good researchers can explain their research to both specialists and non-specialists to ensure their work is understood and appreciated by a wider audience.
6. **Time management:** To understand what are the characteristics of a good researcher, first ask yourself if you manage your time well. Most successful researchers organize, prioritize, and optimize their time efficiently, allowing them to not only keep up with their responsibilities but also make time for personal tasks. If you're being pulled in different directions or overwhelmed with trying to manage your research, stay updated on your research reading, or meeting your writing deadlines, consider honing this skill as a prerequisite to becoming a good researcher.
7. **Persistence and flexibility:** Research can be a long, difficult process with several hurdles and changes along the way. One of the key requirements to becoming a good researcher is being able to adapt to new technologies and changing circumstances and persevere despite setbacks and challenges that inevitably arise. Developing the qualities of a good researcher means anticipating problems, adjusting plans to tackle challenges head-on, and being patient while moving forward toward achieving your goals.
8. **Focus on self-care:** Anxiety, stress, and mental health issues are common among academics. Successful

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researchers are better equipped to manage this by adopting a healthy balanced lifestyle. Understanding what works for you can also improve your efficiency and productivity. Being aware of your strengths and weaknesses and using this to your advantage is key to becoming a good researcher.

Cooperative system among educated people

The cooperative system for self-reliance among educated individuals offers numerous benefits but also faces several challenges, such as skepticism, deception, unhealthy competition, and ethical concerns. These issues can be effectively addressed by fostering open communication, building trust, and creating an environment that promotes collective growth. It is essential to adopt a rational approach, recognizing that each person has unique strengths in specific areas, and allowing individuals to focus on their expertise without expecting everyone to perform every task in the group. Inclusivity in the workplace is another key pillar for achieving the goals of the cooperative system. To succeed, everyone must contribute according to their capacity and capabilities, while maintaining dignity and respect.

Session 3

Academic & Public Service Opportunities

Opportunities in advance studies and professional development

Academic and public service opportunities in connection to career development in veterinary and animal sciences

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Introduction

The arena of Veterinary and Animal Sciences offers a variety of career opportunities in diverse fields like academic pursuits, research careers, and clinical and public service sectors. Veterinarians are not only engaging the health and well-being of the animals but also taking a pivotal role in protecting public health, food security, and environmental sustainability. Herein we will discuss various existing opportunities for veterinarians as their career options.

1. Academic Prospects

Academic openings in Veterinary and Animal Sciences offer a solid basis for career development in diverse fields of research, teaching, and extension. These prospects help veterinarians to uplift their knowledge for scientific progress, and to develop the next generation of smart veterinarians.

- **Veterinary education:** In general, the career of a veterinarian starts with a veterinary degree from an accredited organization. Veterinary degree programs are designed in a standard scientific way to produce veterinarians for performing good clinical practice, future research, and management roles. Many universities, deemed universities offer Post-graduate and Ph.D. programs for the creation of specialized veterinarians and research scientists.
- **Research prospects:** Veterinarians and animal scientists in academic settings frequently pursue research in surgery, Gynaecology, the biomedical field, medicine, animal genetics, molecular biology, microbiology, and so on to contribute to the advancements in animal health and care, addressing issues like antimicrobial drug resistance, emergent infectious diseases, and sustainable livestock production and to open a new vista in veterinary and relevant sciences. Most research in the veterinary and animal sciences is multidisciplinary, frequently amalgamating biology, medicine, and biomedical fundamentals.
- **As a teaching faculty:** Faculty positions at veterinary faculties or universities are a good option for fulfilling academic careers for veterinarians having a strong desire to teach. Along with teaching students about the healthcare of animals, veterinarians also act as counsellors, serving young professionals along their academic path. Further, teachers can also contribute to outreach activities, and assist different committees in the formulation of timely needed curricula in veterinary and animal husbandry.
- **Programs for continuing education and certification:** academic institutions frequently organize different training programs to update the knowledge of the practicing veterinarians to offer the best services to the animal creatures. They can get certificates on the latest developments in veterinary sciences through

these specialized training programs in diverse fields of veterinary surgery, medicine, the latest pathological techniques, dentistry, etc. These programs open a new floodgate on the scope of employment opportunities both in the public and private sectors.

2. Public service prospects in veterinary and animal sciences

As a career development path in the veterinary and animal sciences, public service is an alternative avenue for endorsing animal welfare, influencing public health policies, and sustaining health projects. Several career paths exist in public service positions locally, in national and international areas.

- **Governmental organizations and governing establishments:** Many veterinarians are engaged in worthwhile professions in government organizations and governing establishments like FAO, FDA, the Centres for Disease Control and Prevention (CDC), and other similar agencies in their countries. These particular positions are mainly focused on fields such as animal health control, public health, and food supply safety. In these roles, veterinarians are typically engaged in the studies of public health hazards, viz. zoonotic disease prevention, policy creation, food safety inspections, and animal illness surveillance.
- **Disease surveillance and public health:** Veterinarians who specialize in public health and disease control are often responsible for the detection and prevention of relatable causes that could infect humans and animals. They thoroughly work on several factors and successive solutions to stop versatile diseases such as the uncontrolled spread of zoonotic diseases such as Ebola, avian influenza, and rabies. In general, veterinarians have close collaboration with other medical experts and specialists to keep an eye on illness trends and generate several crucial propagandas to manage and control risk factors associated with infectious diseases. In a nutshell, by contributing all these efforts, veterinarians have made significant involvements to public health protection and diminish the adverse effects of infectious diseases on humans and animals.
- **Advocacy and animal welfare:** Veterinarians endorse quality living environments for animals in farms, zoos, research institutes, and other industries by working with different government organizations and also in close collaboration with several non-profit animal welfare organizations. To augment the ethical treatment of animals, they frequently conduct inspections and offer legislative support by working with legislators.
- **International organizations and NGOs:** To offer standard and quality public and animal health services, veterinarians also work with International standard organizations such as the World Organization for Animal Health (OIE) and World Health Organization (WHO). During these collaborative operations, they often participate in disease eradication initiatives (such as those for rabies or foot-and-mouth disease), disaster response teams, and several other programs that could enhance livestock production methods and impart sustainability to the areas struggling with food scarcity.
- **Environmental conservation:** Wildlife conservation is also a significant wing for veterinarians to include their expertise to promote public health improvement along with animal wellbeing. Environmental conservation includes controlling wildlife populations, protecting endangered species, and nurturing biodiversity. In this discipline, veterinarians might work for Government organizations as well as for non-profit wildlife conservation organizations to rehabilitate wildlife and safeguard animals against human-created hazards including climate change, habitat destruction, and poaching along with treatment of sick and injured animals.

3. The connection of academic and public service careers

To contribute to Public Service Careers in veterinary and animal science a complementary collaboration between public service and academic sectors is a necessary factor. While finding the cause and controlling an urgent issue such as food safety and animal-borne diseases various institutes and their registered researchers work under public health agencies, veterinarians who are employed by government agencies and non-profit organizations also work simultaneously as academic researchers. In the entire career of veterinarians, they cumulatively serve between clinical, academic, and public service responsibilities.

Conclusion

In conclusion, diverse and lucrative employment options are available in the veterinary and animal sciences professions, especially in the context of public service and the academic arena. To enhance the health and well-being of both the public and animals, professionals who are employed in education, public health, research, government regulation, animal welfare, and conservation are important contributors. Veterinarians can grow independently as well as professionally to make an impact on society by contributing to animal welfare and public health activities. As the world continues to face diverse issues such as public health, animal health, and environmental sustainability opportunities, the need for qualified and professional veterinarians will increase soon.

Career development workshop in veterinary and animal sciences

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Veterinary science is much more than a profession—it is a calling. It bridges human and animal welfare, safeguards public health, and plays a pivotal role in sustainable development. This field presents an array of opportunities that are continually evolving in tandem with global advancements.

Why career development workshop is important?

Career development workshops are crucial for professionals, especially in specialized fields like veterinary and animal sciences, for several reasons:

1. Guidance in navigating career paths

- These workshops provide clarity on the various career options available, whether in academia, industry, government roles, or international opportunities.
- They help individuals understand the specific skills and qualifications needed to achieve their goals.

2. Awareness of evolving trends

- The field of veterinary and animal sciences is dynamic, with advancements in technology, research, and global practices.
- Workshops highlight emerging opportunities, such as roles in public health, wildlife conservation, and biotechnology.

3. Skill development

- Career workshops often include sessions on essential skills like communication, networking, and leadership, which are vital for professional growth.
- Participants learn practical tips for interviews, resume building, and navigating the job market.

4. Motivation and confidence building

- Hearing success stories and interacting with experts in the field can be incredibly motivating for attendees.
- Workshops provide a supportive environment where individuals can overcome doubts and gain confidence in their abilities.

5. Networking opportunities

- Career workshops bring together students, professionals, and industry experts, creating a platform for networking.
- This helps participants build connections that can lead to internships, job offers, or collaborations.

6. Global exposure

- For fields like veterinary and animal sciences, the workshop may introduce participants to international practices, study programs, and career opportunities abroad.
- It enables individuals to think beyond local boundaries and embrace a global perspective.

7. Practical knowledge

- Workshops often include hands-on sessions, case studies, or panel discussions that provide real-world insights.

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- They equip attendees with tools to address challenges in their career paths.

Overall, career development workshops are not just about finding a job—they are about shaping a fulfilling and impactful career while staying updated on the ever-changing landscape of the field.

Opportunities for veterinary and animal husbandry graduates

Academic opportunities

1. Teaching and research

- **In India:** Positions in veterinary colleges, universities, and research institutes
- **Abroad:** Opportunities in renowned institutions such as the Royal Veterinary College (UK), University of Sydney (Australia), and Cornell University (USA). These institutions offer advanced research programs in areas like animal genetics, zoonotic diseases, and wildlife conservation.

2. Advanced studies

- **In India:** Postgraduate studies in specialized fields.
- **Abroad:** International programs in veterinary science, such as those offered by the University of Edinburgh (UK) and Utrecht University (Netherlands), provide exposure to cutting-edge technologies and practices.

3. Scholarships

- Scholarships like the AKC Humane Fund and Zoetis/AAVMC Veterinary Student Scholarship Program in the US can support students pursuing veterinary studies abroad.

Public service opportunities

1. Government roles

- **In India:** Positions in animal husbandry departments, livestock development, and public health.
- **Abroad:** Roles in organizations like the USDA (United States Department of Agriculture) and DEFRA (Department for Environment, Food & Rural Affairs, UK) focusing on animal welfare and disease control.

2. Wildlife conservation

- **In India:** Work in national parks and wildlife sanctuaries.
- **Abroad:** Opportunities in wildlife conservation projects in countries like Australia, South Africa, and Costa Rica. Internships and jobs in wildlife reserves and conservation organizations are available.

3. Public health

- **In India:** Zoonotic disease control and food safety.
- **Abroad:** Positions in international organizations like the World Health Organization (WHO) and Food and Agriculture Organization (FAO), focusing on global animal health and food security.

Additional opportunities abroad

1. Internship

- Internships in veterinary medicine and animal care are available in countries like Argentina, Greece, and Spain. These provide hands-on experience in diagnostics, medical procedures, and rehabilitation.

2. Clinical practice

- Graduates can work in veterinary clinics and hospitals in countries with high demand for veterinary professionals, such as Canada, Australia, and the UK.

3. Research and development

- Opportunities in pharmaceutical companies and research institutions abroad to develop vaccines, medicines, and innovative treatments for animals.

4. Animal welfare advocacy

- Work with international NGOs like PETA and WWF to promote animal welfare and conservation.

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- These opportunities offer a chance to contribute to animal health and welfare globally while gaining valuable experience and exposure.

Diverse career paths ventured by veterinary graduates

Graduates from veterinary colleges like the West Bengal University of Animal and Fishery Sciences (WBUAFS), Bengal Veterinary College, and other reputed institutions in India have successfully ventured into diverse career paths. Here are some real examples of placement areas:

1. Government services

- **Veterinary Officers:** Many graduates secure positions as Veterinary Officers in state animal husbandry departments, focusing on livestock health, disease control, and rural development.
- **Public health roles:** Graduates work in zoonotic disease control and food safety under organizations like the Food Safety and Standards Authority of India (FSSAI).

2. Academia and research

- **Teaching:** Alumni often join veterinary colleges as lecturers or professors, contributing to education and research.
- **Research institutes:** Graduates work in premier institutes like the Indian Veterinary Research Institute (IVRI) and National Dairy Research Institute (NDRI), focusing on animal genetics, vaccine development, and disease management.

3. Private sector

- **Pharmaceutical companies:** Graduates are employed by companies like Zoetis, Himalaya, and Mankind Pharma, working in veterinary drug development and marketing.
- **Dairy and food industry:** Companies like Amul, Mother Dairy, and Nestlé recruit graduates for roles in quality control, production, and animal nutrition.

4. Wildlife and conservation

- **Wildlife veterinarians:** Some graduates work in national parks and wildlife sanctuaries, providing medical care to wild animals and participating in conservation projects.
- **NGOs:** Organizations like WWF and PETA employ veterinarians for animal welfare and advocacy.

5. Entrepreneurship

- **Private clinics:** Many graduates establish their own veterinary clinics, offering services for pets and livestock.
- **Animal farms:** Some venture into managing or owning dairy farms, poultry farms, or aquaculture units.

6. International opportunities

- Graduates from Indian veterinary colleges often pursue higher studies or work abroad in countries like the USA, Canada, and Australia, where there is a high demand for veterinary professionals.

These examples highlight the versatility of career options available to veterinary graduates.

Through this workshop, we will delve into various aspects of career development, from academia and research to public service, wildlife conservation, and even entrepreneurial ventures. What stands out most is the immense potential of this field to make a lasting impact—not just on animal health and welfare, but also on public health, environmental sustainability, and the economy.

I will urge all participants to take the knowledge and inspiration to be gained and turn it into action. Explore the wide array of paths available, whether in government, private sector, international platforms, or beyond. Remember, the work you do as veterinary professionals will always hold the power to influence lives in profound ways.

Lastly, let me express my gratitude to the organizers, speakers, and participants. I hope the connections formed through this event will serve as catalysts for future growth and collaboration.

Let us continue to push boundaries, innovate, and work toward a brighter future in the field of veterinary and animal sciences. Thank you, and I wish you all great success in your endeavours ahead.

Career development in veterinary and animal sciences in Germany for Indians

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Introduction

Veterinary medicine is a highly respected profession in Germany. It follows a structured education and rigorous licensing process. For Indian students and professionals planning to establish a professional or academic career in veterinary and animal sciences in Germany, it is important to understand the education system, licensing requirements, and job opportunities. This paper presents an overview of career development in this field, covering different aspects from higher study to recognition and licensing process for Indian veterinary degrees.

Studying Veterinary Medicine in Germany

Veterinary medicine is one of the most competitive courses in Germany, like human medicine. Admission to veterinary schools is highly selective, requiring a strong academic record. The **numerus clausus (NC)** system applies, which means only applicants with excellent grades are admitted.

The veterinary degree program is for **six years** and is divided into two main phases:

1. **Scientific-Theoretical Phase (8 Semesters):** This phase consists of theoretical studies, covering subjects like anatomy, pathology, microbiology, and pharmacology.
2. **Practical Training & State Examination:** Students gain hands-on experience in veterinary clinics, livestock farms, slaughterhouses, and food safety inspection facilities. Following a one-year internship, they must pass the state examination to qualify as veterinarians.

Many graduates open their own practices, while others work in veterinary hospitals, food safety, pharmaceutical industries or livestock management.

Veterinary Medicine Faculties in Germany: Animal courses are introduced at several colleges which are mostly in line with behavioral sciences or zoology. However, predominantly, full veterinary courses are in five universities as below:

- | | |
|---|---|
| 1. University of Veterinary Medicine Hannover (TiHo) | 4. Ludwig Maximilian University of Munich |
| 2. Free University of Berlin (Freie Universität Berlin) | (LMU Munich) |
| 3. Justus Liebig University Giessen | 5. University of Leipzig |

Career Pathways for Indian Veterinarians in Germany

For Indian veterinarians looking to practice in Germany, the recognition of their degree and obtaining a license (Approbation) is essential. This process ensures that their qualifications align with German veterinary education standards.

Step 1: Equivalence Assessment (Gleichwertigkeitsprüfung)

The competent authority evaluates an applicant's veterinary degree to determine whether it meets German standards.

- If the degree is **fully equivalent**, the applicant receives **full recognition** and can apply for Approbation.
- If **significant differences** are found, additional tests (Kenntnisprüfungen) or adaptation measures such as internships or courses may be required.

Professional Experience (Berufserfahrung): Professional experience can be a factor in the equivalence assessment.

Step 2: Application for License to Practice (Approbation)

All veterinarians, regardless of nationality, must obtain an official license from the relevant German authority to practice independently.

Step 3: Language Proficiency Requirement

Veterinary professionals must demonstrate **German language proficiency (B1/B2 level)** since communication with clients, colleagues, and regulatory authorities is crucial. It is recommended to enroll in German language courses through institutions like the Goethe Institut.

Step 4: Knowledge Tests and Temporary Work Permit

Indian veterinarians may have to undertake up to **15 practical and oral examinations** covering different aspects of veterinary practice in Germany. Before obtaining a full license, they may apply for a **temporary work permit (Berufserlaubnis)**, valid for up to **four years**.

Professional Licensing in Germany

The veterinary profession in Germany is regulated under the **Bundestierärzteordnung (BTÄO)**. Licensing differs based on the applicant's country of qualification:

- **EU/EEA graduates:** Their degrees are automatically recognized, requiring only proof of German language proficiency.
- **Non-EU/EEA graduates (including India):** They must go through the equivalence assessment, language tests, and professional exams.

Recognition Process for Indian Veterinary Degrees

Indian veterinarians must apply for degree recognition at the competent German authority in the federal state where they wish to work. The official **Anerkennung in Deutschland** website provides detailed guidelines.

Options for Licensing

1. Temporary License (Berufserlaubnis):

- o A limited recognition that allows veterinarians to work under supervision.
- o Requires an official job offer or employment contract.
- o Does not guarantee full recognition of qualifications.

2. Permanent License (Approbation):

- o Grants unrestricted rights to practice as a veterinarian in Germany.
- o Requires successful completion of equivalence tests.
- o Can be obtained through adaptation courses or qualifying examinations at one of Germany's veterinary schools (Berlin, Giessen, Hannover, Leipzig or Munich).

Animal Research in Germany

Research Institutes for Animal and Veterinary Sciences in Germany: There are several research Institute working on Animal sciences under four major verticals like Leibniz, Helmholtz, Max Planck & Fraunhofer Society. Some of them are as follows:

1. Leibniz Institute for Zoo and Wildlife Research (IZW), Berlin: The IZW conducts research on wildlife and zoo animals, with a focus on conservation, behaviour, and ecology.
2. Leibniz Institute for Animal Biology (FBN), Dummerstorf, Rostock: The FBN conducts research on farm animals, specially on genetics, nutrition, & animal health.
3. Leibniz Centre for Agricultural Landscape Research (ZALF), Berlin: ZALF conducts research on agricultural landscapes, including animal health & welfare.
4. Helmholtz; Max Delbrück Centre (MDC) for Molecular Medicine in the Helmholtz Association, Berlin: MDC combines basic molecular biology research with clinical research and is dedicated to the research foci of systems medicine and cardiovascular diseases

5. Max Planck Institute of Animal Behaviour (MPIAB), Konstanz: MPIAB aims to understand and predict animal decision-making in the natural world.

Research positions: The research positions in Germany are good in the name of Postdoctoral research positions, Senior scientist positions, Group leader positions, Opportunities for collaboration and networking with international partners.

Research Areas: There are several research areas around Animal sciences. Some of them are as follows:

- | | |
|---|--------------------------------------|
| 1. Animal health and disease prevention | 5. Conservation and wildlife biology |
| 2. Animal welfare and behaviour | 6. Animal-human interface and |
| 3. Genetics and genomics | 7. Zoonotic diseases etc. |
| 4. Nutrition and feed science | |

Career Opportunities for Veterinarians and Veterinary Research in Germany

After obtaining a veterinary license, veterinarians have multiple career options, however which is not required for Research positions.

1. **Private Practice:** Many veterinarians in Germany establish their own clinics, providing care for pets, livestock, and exotic animals.
2. **Veterinary Hospitals & Clinics:** Working in established veterinary facilities is a common career path.
3. **Public Veterinary Sector:** Involves roles in food safety, animal welfare, and disease control.
4. **Pharmaceutical & Research Industry:** Veterinarians contribute to drug development and clinical trials.
5. **Livestock Management & Meat Production:** Ensuring compliance with hygiene and safety standards.
6. **Academic & Teaching Careers:** Many experienced veterinarians work as educators and researchers in universities.
7. **Research:** Postdoctoral, Senior scientist and Group leader positions,

Salary Expectations

Veterinary salaries in Germany vary based on experience, location, and job role:

- **Entry-level veterinarians:** €30,000 – €45,000 per year.
- **Experienced veterinarians:** €50,000 – €80,000 per year.
- **Self-employed veterinarians:** Income varies but can exceed €100,000 annually, depending on the clinic's clientele and location.

Conclusion

Germany offers superior opportunities for Indian veterinarians aspiring a career in veterinary and animal sciences. The road-map involves stringent procedures like rigorous assessments, language proficiency, and licensing methods. Those who successfully navigate these process steps, can build rewarding careers in various veterinary fields. Whether working in clinical practice, research, academy, public health, or livestock management, veterinarians play a crucial role in Germany's thriving animal healthcare industry. By preparing well and following the necessary recognition procedures, Indian veterinarians can successfully integrate into Germany's veterinary sector & enjoy a fulfilling professional journey with satisfaction.

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Career in Veterinary Science

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Veterinary Science, allied to the Medical Science profession, deals with the prevention, control, diagnosis, and treatment of diseases affecting the health of domestic and wild animals besides prevention of transmission of animal diseases to people. Veterinarians, the custodian of the profession, ensure safe food supply & nutritional security for people particularly protein supplementation in terms of milk, meat, egg; prevent zoonotic threats to mankind and encompass well being of all sorts of animals, viz. livestock/food animals including poultry, companion and zoo animals. Veterinarian's job includes caring of animals, breeding and handling of livestock, conserving animal gene-pool, and maintaining biodiversity and environmental sustainability. Hence role and contribution of a veterinarian in society is enormous and noble.

Historical perspectives

The literature reveals that a veterinary cult existed on the Indian subcontinent as far back as 3,000 to 4,000 years ago. As per the existing literatures, we came to know the veterinary hospitals used to exist during the ruling period of Chandra Gupta Mourya (300-298BC) and King Asoka (237-232BC). At that time, veterinarians were called as *Salihotriya* and designated as *Salutri*, after the famous horse medicine authority Salihotra, the son of a Brahmin sage, Hayagoshha. Modern Veterinary Medicine started in the hand of modern veterinary education in India that began in 1862 with the establishment of an army veterinary school in Pune. The first civil veterinary school was started in Babugarh (Hapur), in Uttar Pradesh, in 1877. The first veterinary college was started at Lahore, now in Pakistan, in 1882. The establishment of a veterinary research laboratory in India was recommended in 1885 and actually took shape in 1889 at Pune. In 1983, this laboratory was moved to Mukteshwar in the Kumaun Hills of Uttar Pradesh (Now Uttarakhand) and latter known as Indian Veterinary Research Institute (IVRI) with Headquarters (Main campus) at Bareilly, UP. The Bombay Veterinary College was founded in 1886. Subsequently, in 1884 (10th January) Bengal Veterinary College (in Calcutta) and in 1903 Madras Veterinary College were established.

Why to opt Veterinary Profession

In India, tremendous progress has been made in livestock sector in terms of production and productivity. It is a proud moment for every Indian citizen to learn that India is the largest producer of milk globally with 24 percent share in total milk production in the world. The dairy sector is the most critical component of the Indian livestock sector, employing more than eight crore farmers directly. While India ranks first in milk production in the world, it ranks second in egg production and fifth in meat production in the world. India is First in total livestock population in the world. It is First in total buffalo population in the world (57% of the world population), 2nd in total Goat population in the world, 3rd in total Sheep population in the world and 5th in total egg production in the world.

It is the result of joint efforts of the farmers, policy makers and the veterinarians of the country who gave proper technological inputs in breeding, up-gradation, feeding, and maintenance of livestock. Opting for veterinary science as a profession is often driven by passion and motivation to the serve nature and preserve the entities provided by nature such as animals, natural resources etc. Veterinary science offers great career scope to such passionate aspirants and this is proven by the following lucrative statistical facts about the profession: i. It has been observed that the Indian veterinary healthcare market was almost valued at USD 1,169.8 million in 2021 and is predicted to almost reach USD 1,856.3 million by 2027, ii. The Indian Animal Health Industry has been growing immensely and has been observed to be around INR 7000 Crore and more than 50 companies are operating in this sector, iii. Livestock is an essential part of the Indian economy as it contributes greatly to the

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socio-economic well-being of the country as livestock almost contributes to 4.5% of the country's economy, iv. About 16.44 million working people of India is directly associated with livestock sector, v. Livestock Sector not only provides essential proteins and nutritious human diet through milk, eggs, meat etc., but also plays an important role in utilization of non-edible agricultural by-products, vi. Livestock are the best insurance against the natural calamities, viz. drought, famine and flood etc. vii. They support primary family income and generate self-employment, especially to landless, marginal farmers, weaker sections, un-employed youth, women etc.

Way to be a Veterinarian

Presently, there are 58 VCI (Veterinary Council of India) recognized Veterinary colleges affiliated under 29 Veterinary Science/Agriculture Universities, covered in 24 states in India. These colleges offer Bachelor of Veterinary and Animal Husbandry (B.V.Sc & A.H.) degree after completion of the five and half year's course including one year of internship programme. Candidates are selected for this five and half years B.V.Sc & A.H. course on the basis of performance of NEET (conducted by NTA) or the entrance test conducted by VCI at National level or by individual State Veterinary/Agriculture University at State level.

After coming out from the college as a veterinary graduate taking the Veterinarian's oath, he/she become a registered veterinarian after completing the formalities in the state veterinary council and/or veterinary council of India.

Career options of Veterinarians

After completion of graduation, an Indian veterinarian may either opt for independent veterinary practice/ state or central Govt. or private sector service/own business/self-employment or he/she may pursue higher studies in the universities for post graduate (Master's) and subsequently doctoral (Ph.D.) programmes.

There are many avenues open to a graduate/post graduate veterinarian and some of the important organizations/establishments/agencies engaging veterinary graduates/post graduates are given below:

- i. Animal Husbandry Departments of State Governments (Department of Animal Husbandry & Veterinary Services), Corporations/municipalities: Veterinary graduates are selected as Veterinary Officers (under Animal Husbandry and Veterinary Services) through State Public Service Commission selection process and are posted to the animal health centres/sub-centres and hospitals of various blocks/districts of the state. They may be posted in livestock farms/poultry units, slaughter house, municipalities, zoo gardens also. Their responsibility includes treatment of sick/ailing animals, organizing vaccination and animal health camps besides awareness programmes for scientific animal husbandry practices among farmers/stakeholders, attending animal disease outbreaks/epidemics, implementing various Government programmes including disease control programmes etc.
- ii. Agriculture Research Service [Under Indian Council of Agriculture Research]: Post graduate candidates are selected as Scientists (under Agriculture Research Service) by Agriculture Scientist Recruitment Board (ASRB) of ICAR by their selection process and given posting in various research institutes/ establishments located in different Indian states and Union territories including premier National Institutions, viz. Indian Veterinary Research Institutes (IVRI), Izatnagar, Bareilly (U.P.) and National dairy Research Institutes (NDRI), Karnal (Haryana).
- iii. Teachers of Veterinary colleges/Universities: Post graduate/doctorate candidates having NET (National Eligibility Test) Certificates obtained through examination conducted by ASRB, are selected as Assistant Professors by the selection committees of the VCI recognized 24 state veterinary colleges/universities located in different states (details available in VCI web-site). Their responsibilities include teaching, research and extension services related to veterinary sciences and technologies.
- iv. Milk Federations (state/national level): Veterinary graduates are posted as farm manager/veterinarian to look after the farm animals and their production and productivity.
- v. Livestock/poultry farms: Veterinary graduates are posted in private animal farms as managers,

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veterinarians to take care of the well being of the animals and their productivity.

- vi. Krishi Vigyan Kendra under agricultural universities, funded by ICAR: Post graduates are given posting as subject matter specialists for consultancy and farmers' training programmes.
- vii. Livestock/poultry feed formulations and products units: Post graduate veterinarians are entrusted to feed formulations (Animal Nutritionists) and animal product preparations (specialists in Livestock Products Technology) in private companies.
- viii. Equine husbandry units: Veterinarians are posted in race-course/turf-clubs, stud farms to look after the well-being of horses, breeding and management etc.
- ix. India Army/Paramilitary services (Ramount Veterinary Corps, Border Security force, Indo-Tibetan Border Police): Graduate and post graduate veterinary candidates are given chance to serve the nation to protect animal and human lives.
- x. Research Laboratories (R& D services), e.g. vaccines and diagnostic units: Veterinarian with post graduation in Para-clinical (Microbiology, Pathology, Parasitology, Pharmacology etc.) and relevant subjects (Biochemistry, Biotechnology) are eligible for the posts.
- xi. Wild life conservation (Zoo gardens, sanctuaries): Veterinarian with special training wild and zoo animals are posted in Sanctuaries, Reserve forests, National Parks, Zoological gardens to look after wild and zoo animals and natural resources.
- xii. Indian Forest Service: Veterinarian with special training forest & wildlife conservation are entrusted to protect Indian forests and National wildlife parks.
- xiii. Banking sector (nationalized and rural banks & LIC): Veterinary graduates are eligible to serve nationalized and rural banks as probationary officers and veterinary officers in life insurance companies looking after livestock insurance.
- xiv. Pharmaceutical industries (drug testing etc.): Veterinary graduates are entrusted for various posts related to sales and marketing in private pharma-industry.
- xv. Agro-business Industry: Veterinarian with post-graduation in business management may develop their career in the fast growing agro-based industries, specifically in Livestock Business Management.
- xvi. Non-Government organizations (Consultancy services): Veterinarians may work as consultants to provide technological knowledge in various NGOs.
- xvii. Laboratory Animal Unit of Research Institutes: Posting of Veterinarian is mandatory in laboratory animal unit of research institutions run by various councils/organizations (CSIR, ICMR, ICAR, DRDO, DBT, DST etc.). Veterinary graduates and post-graduates are posted to look after the well-being of the laboratory animals and researches/experiments/drug-testing etc. on them.
- xviii. Civil services: Veterinary graduates may opt for Government Administrative service i.e. Central and state civil services by passing civil service examinations with optional subject- Animal Husbandry and Veterinary Science.

Besides the above mentioned job opportunities in India, Indian Veterinary Graduates may opt for their career (higher studies and jobs) in various foreign countries; the lucrative options being Canada, USA, Australia, UK, Germany, Denmark and Russia.

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Session 4

Industry Role and Entrepreneurship
Role of Industry in Professional Development

Expanding horizons: Veterinarians in industry, policy, and innovation

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Introduction

The veterinary profession plays an essential role in India's economic and industrial development, particularly in the livestock and agriculture sectors. With over 70% of the rural population engaged in agriculture and animal husbandry, veterinarians serve as the backbone of livestock management, disease control, and productivity enhancement. Their expertise extends beyond clinical practice to include food safety, public health, biotechnology, and entrepreneurship. The advantage of a veterinary science course lies in its diverse curriculum, offering extensive career opportunities in livestock health, research, food safety, and entrepreneurship, making veterinarians essential across multiple industries. Additionally, veterinary science drives industrial and economic growth by ensuring livestock health and advancing dairy, meat, poultry, leather, and pharmaceuticals. Veterinarians contribute to nutrition, vaccine production, and genetics modifications, thus playing a vital role in the bio-economy. Also, growing demand for quality animal products and technology has further expanded their role in industry and entrepreneurship.

Since independence, India's livestock sector has grown tremendously due to government initiatives, scientific advancements, and policy reforms. The White Revolution, veterinary healthcare improvements, and research institutions have enhanced milk, meat, and egg production, increasing rural incomes and employment. Veterinarians have been central to this transformation by implementing disease control programs, improving breeding techniques, and supporting livestock-based industries. This article explores veterinarians' diverse roles in shaping India's economy, focusing on livestock productivity, public health, policy advocacy, and entrepreneurial opportunities, emphasizing their contributions beyond traditional veterinary practice.

Contributions of veterinarians in addressing food security and safety

Veterinarians play a critical role in mitigating protein hunger by ensuring the production of high-quality animal protein, including milk, meat, eggs, and fish. Through scientific breeding, nutrition management, and disease prevention strategies, they contribute to enhancing the productivity of livestock and poultry. Their role in food safety regulations, such as those mandated by the Food Safety and Standards Authority of India (FSSAI), ensures that animal-derived food products meet safety and hygiene standards, protecting public health.

Veterinarians also collaborate with regulatory bodies such as the Agricultural and Processed Food Products Export Development Authority (APEDA), the Bureau of Indian Standards (BIS), and state animal husbandry departments to maintain stringent quality control measures. By implementing biosecurity measures, veterinarians help prevent zoonotic diseases and contamination in the food chain, thereby strengthening India's food security. Furthermore, they play a pivotal role in training farmers and food processors on best practices for hygienic milk and meat production, antibiotic residue control, and disease surveillance.

Also, with the rise of precision farming, veterinarians are increasingly involved in ensuring traceability and food safety by leveraging blockchain technology and AI-driven quality assessment tools. These advancements enable real-time monitoring of livestock health, reducing the risks of contamination and

improving the overall nutritional quality of animal-derived food products. By integrating their expertise with evolving food safety regulations and technological advancements, veterinarians continue to be key players in securing a safe and sustainable food supply for India's growing population.

Contributions of veterinarians in livestock productivity

a. Dairy industry

India's dairy industry has undergone a remarkable transformation since independence, with milk production increasing from 17 million tonnes in 1950-51 to over 220 million tonnes in recent years. This substantial growth has positioned India as the world's largest milk producer, significantly contributing to the nation's economy. The dairy sector accounts for approximately 5% of India's national GDP and is valued at around ¹ 10 lakh crore annually.

Veterinarians have played a crucial role in this transformation by implementing advanced reproductive technologies that have improved cattle breeds, leading to higher milk yields. Their role in disease prevention through vaccination, health check-ups, and biosecurity measures has ensured the health of dairy animals and enhanced productivity. Additionally, veterinarians contribute to selective breeding programs, ensuring high-yielding and disease-resistant livestock. Through their expertise in animal nutrition, they formulate balanced diets and recommend optimal feeding practices, further boosting milk production.

Dr. Verghese Kurien, the architect of India's White Revolution, worked closely with veterinary professionals to develop crossbreeding programs that significantly enhanced milk yields. Similarly, the National Dairy Development Board (NDDB) has collaborated with veterinarians to establish high-quality breeding and feeding strategies that have propelled the dairy sector's growth. These advancements have not only improved productivity but have also generated substantial employment opportunities. The dairy industry supports over 80 million farmers, providing them with a stable source of income. Women have particularly benefited from this sector, with approximately 71% of dairy farmers being female, contributing to gender empowerment in rural areas.

b. Meat industry

India's meat industry has grown significantly since 1950-51, with production increasing from 0.3 million tonnes to approximately 9.77 million metric tonnes in 2023. This expansion has led to the development of an organized meat industry valued at around ¹ 1.5 lakh crore.

Veterinarians play a pivotal role in maintaining meat quality and safety by monitoring animal health, ensuring proper hygiene in slaughterhouses, and implementing disease control measures. Their role in meat inspection ensures that only disease-free and healthy animals are processed, protecting consumers from zoonotic diseases. This focus on quality assurance has also facilitated the growth of India's meat exports, which are valued at approximately ¹ 30,000 crore annually. Notably, Indian veterinarians have pioneered rapid meat inspection techniques and traceability systems, ensuring global compliance with food safety standards. The Meat Products of India (MPI) initiative has leveraged veterinary expertise to enhance meat processing and export efficiency.

c. Poultry industry

India's poultry industry has witnessed exponential growth over the past few decades. Egg production has surged from 1.8 billion in 1950-51 to over 147 billion in 2023-24, making India the third-largest egg producer globally. The poultry industry is valued at approximately ¹ 2.6 lakh crore, with exports contributing around ¹ 5,000 crore annually.

Veterinarians have played a critical role in this expansion by implementing disease prevention programs, particularly against Avian Influenza, through extensive vaccination and biosecurity measures. Their contributions in genetic research have resulted in high-yield poultry breeds with improved productivity and

disease resistance. One of the most notable breakthroughs in this field is the development of high-yielding poultry breeds by the Central Avian Research Institute (CARI), where veterinary scientists have engineered improved breeds that are more resistant to diseases and have higher production rates. The poultry sector is a significant source of employment, directly and indirectly supporting over 25 million jobs across farming, processing, and distribution. Veterinarians' continued contributions to the industry ensure food security and economic growth.

d. Pharmaceutical industry

The Indian veterinary medicine market has shown substantial growth, with valuations ranging from USD 869.8 million in 2024 to USD 1.80 billion in 2023, depending on the source. Projections indicate continued expansion, with expectations of reaching USD 2.05 billion by 2030, reflecting a compound annual growth rate (CAGR) of approximately 8.63%. Veterinarians are integral to this sector, contributing to the development and administration of essential livestock vaccines targeting diseases such as Foot-and-Mouth Disease (FMD), Brucellosis, and Peste des Petits Ruminants (PPR). These efforts are crucial in preventing disease outbreaks and ensuring the health of livestock populations.

India's export of veterinary biologics, including vaccines, has also been noteworthy. In 2023, the country exported veterinary vaccines valued at approximately \$8.59 million, with significant quantities shipped to nations like Nepal, Nigeria, and Sri Lanka. This underscores the global demand for high-quality veterinary products and India's potential to meet this need.

Veterinary startups revolutionizing animal healthcare and agribusiness

The veterinary sector in India has seen a surge in entrepreneurial ventures, driven by the increasing demand for pet healthcare, livestock management, and technological advancements. Startups focusing on pet healthcare provide specialized services, including wellness programs, grooming, and emergency care. In recent times, mobile veterinary services have gained popularity, bringing doorstep healthcare solutions to both urban pet owners and rural livestock farmers. Alongside, integration of AI-based diagnostics has further enhanced veterinary care by enabling early disease detection and personalized treatment plans. Additionally, online platforms for veterinary products and telemedicine have revolutionized pet and livestock healthcare by providing remote consultations, e-prescriptions, and doorstep delivery of medicines and pet essentials. Notably, the Indian pet care industry, valued at approximately Rs. 10,000 crore, continues to expand, offering vast entrepreneurial opportunities for veterinarians and startups.

Beyond pet care, veterinary startups are making significant contributions to the meat and dairy industries. Several new ventures focus on value-added meat and dairy products, including hygienically processed and packaged meat, organic milk, and functional dairy products. Innovations in meat product development, such as ready-to-cook and ready-to-eat meat items, have created lucrative business opportunities. Additionally, startups are leveraging cold-chain logistics, quality certification, and sustainable processing methods to enhance meat safety and shelf-life. Similarly, in the dairy sector, startups are developing probiotic-enriched dairy products, lactose-free milk, and organic ghee to cater to the growing health-conscious consumer base.

Furthermore, Agri-tech startups are transforming livestock farming with precision livestock farming tools, IoT-based monitoring systems, and blockchain-driven traceability solutions for meat and dairy products. These advancements not only improve production efficiency but also enhance food safety and transparency in the supply chain. With increasing pet ownership, rising disposable incomes, and growing awareness of animal welfare, veterinary entrepreneurship is set to play a crucial role in shaping the future of animal healthcare, livestock-based industries, and the overall food processing sector in India.

Veterinary prospects in government policies and research initiatives

Government policies and research and development (R&D) initiatives have created new opportunities for veterinarians in the domains of science and technology. Various ministries, such as the Department of Animal Husbandry and Dairying (DAHD) and the Department of Science & Technology (DST), provide funding for veterinary-based startups, innovations in biotechnology, and sustainable livestock production. Programs such as the Rashtriya Gokul Mission and National Livestock Mission have facilitated genetic research, disease prevention, and quality feed production, benefiting veterinarians engaged in research and entrepreneurship. Furthermore, schemes like the Livestock Health & Disease Control Programme and the Dairy Entrepreneurship Development Scheme (DEDS) have promoted better livestock health management and financial support for budding entrepreneurs. Moreover, the Make in India and Startup India initiatives, along with increased focus on One Health initiatives, have encouraged the establishment of veterinary biotech firms, vaccine production units, and precision farming startups, further enhancing the role of veterinarians in economic growth and public health.

Conclusion

Veterinarians play an indispensable role in India's economic growth, contributing significantly to job creation, industrial expansion, and the overall development of the livestock and allied sectors. Their expertise extends beyond clinical practice, shaping industries such as dairy, meat, poultry, pharmaceuticals, and animal nutrition, thereby ensuring both economic prosperity and public health. By improving livestock productivity, ensuring food safety, and driving biotechnological innovations, veterinarians help sustain a thriving agricultural economy that supports millions of livelihoods. The vast scope of veterinary science offers a multitude of career opportunities, from livestock management and biotechnology to entrepreneurship and public health, making it one of the most dynamic fields in science and technology.

Additionally, the rise of veterinary entrepreneurship and technological innovations, such as AI-driven diagnostics and telemedicine, further highlight the expanding opportunities within the sector. To fully harness these benefits, continuous investment in veterinary research, education, and infrastructure is essential. Strengthening veterinary institutions, promoting interdisciplinary research, and encouraging innovation will be key to ensuring sustainable development and meeting the evolving demands of a growing population. By fostering a well-equipped veterinary workforce, India can continue to enhance its livestock sector, improve animal health, and secure its place as a global leader in agricultural and industrial advancements.

Career development in veterinary and animal sciences: Industry role and entrepreneurship

T. K. Ghoshal
Principal Scientist and Head
ICAR-Central Institute of Fisheries Education, Kolkata Centre
Kolkata, India

Over last few decades, field of Veterinary and Animal Sciences is receiving more and more importance not only to cater the need of animal health care, public health, food and nutritional security, but also having tremendous business opportunities and become an industry. There is a growing demand of experts in all field of veterinary subjects including veterinary medicine experts and clinical practitioner having specialization in surgery, critical care and emergency situation management, dermatologists, pathologists, anaesthesiologists. There is a need of public health veterinarians having expertise in zoonotic diseases, disease surveillance, animal nutritionists, animal geneticists and breeders, veterinary pharmacists, animal welfare experts, wildlife biologists and conservationists.

There is huge scope of doing entrepreneurship in veterinary and animal sciences such as starting private veterinary practice or opening animal hospital with establishment of own practices. Even establishment of specialized veterinary clinics for example pet dermatology practices, dental practices, emergency care clinics, day care clinics are the specific needs of the society and which provides scopes of establishment in competitive market.

The demand of small animal clinical practice and surgery is increasing as number of companion animal and pet lover is growing rapidly due to societal need. This sector has taken the shape of an industry and provide good scope of own business. There is an increasing demand of pet care services and hence demand of pet industry such as pet food, supplements, grooming, daycare, pet clothing and accessories is there in the pet market. There is also a good business scope on training of pet animals including rectification of behaviour and making pet faithful to the owner. Even innovative technologies and pet products such as GPS collars, pet cameras and health monitoring devices are also in great demand.

Opening own farms like that of livestock, poultry and their training services are also high profitable sectors. Smart and precision animal farm having AI and IoT enabled sensor-based feeding, watering, other managerial activities and robotic milking with high yielding dairy cattle is very promising business areas in modern days. Advanced farm management technology, smart production technology, marker assisted selection cum production technology, advanced nutrition technology are the enterprising areas in veterinary and animal sciences and having scope in the coming days.

There is a huge scope of establishment of startups to take care of animal health including veterinary telemedicine, diagnostics tools, health monitoring. The present world is moving towards sustainable and eco-friendly animal husbandry practices, hence there is a need of development of eco-friendly feed products including low carbon footprint meat and dairy production.

Starting business with manufacturing of animal health product, development of vaccines, antibiotics, probiotics, prebiotics, nutraceuticals and other medications for treatment of wide range of diseases and maintaining of well-being of animals is a promising area.

Even entrepreneurship can be done by starting animal welfare organisations. Though most of these are non-profit entities and focus on rescuing and rehabilitating animals and are not business oriented but successful

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entrepreneurs in this area often starts strategies to raise fund through networking and community engagement to thrive better and do service in a sustainable way.

There is a need of high-quality professionals in this sector. One professional can opt for career in Government sector or with well-established organization or can decide to jump into business as veterinary and animal science sector is growing rapidly over past few decades with so many entrepreneurship option. For flourishing in this field, there's a need of a range of skills and qualities which includes aspects like strong scientific foundation, communication skills, problem-solving abilities, adaptability and resilience, business knowledge and management skill, strategic thinking, innovation and creativity, organization, networking and collaboration, and most importantly empathy.

Briefing it out, career development in Veterinary and Animal Sciences is catalysed by industrial roles and entrepreneurship, which paves the way to the diversity of opportunities to showcase their skills and knowledge. By acquiring the above-mentioned qualities like knowledge related to business, communication skills, and adaptability, Veterinarians and animal scientists can excel in industry and entrepreneurial ventures, leading to new innovations and growth in this field.

As entrepreneurs, they can input technological advancements, with the help of which they can contribute to animal health and welfare, and create sustainable businesses that benefit both humans and animals. As we can conclude, entrepreneurship helps us in to turn our vision into reality, fostering a brighter future for Veterinary and Animal Sciences.

Entrepreneurship

Bhaskar Chaudhuri

Managing Director, Liebig's Agro Chem Pvt. Ltd

Entrepreneurship is a deep-seated physical sensation or instinct which is present even in a day-old baby. A baby cries in order to draw attention from his/her near and dear ones i.e. in other words earn some profit out of his/her act.

The entire human race and even in animals, I believe, this instinct is existing. Without an Entrepreneurial mind people cannot take themselves forward to the next level of life.

Now the call is yours. If you start believing that you have this instinct, may be in dormant form, you will start taking initiative to think in a different way to negotiate the challenges, that life offers on day-to-day basis.

There are absolutely no differences between a job seeker and a job creator so far as the capability in terms of merit, financial status, educational qualification etc. are concerned. Only difference is in your mindset. You need to know how you are thinking to position yourself in your life. If your instinct drives you away from job seeking approach, if it triggers your innovative mind, if it pinches your inner core constantly to create something different, for sure, you will become an Entrepreneur. No other external forces could resist you from implementing your Entrepreneur endeavour.

Of course, Govt. service or services in the private sector (with little bit doubt) financial security will be more. But personally, I feel, we must know what do we mean by financial security. Is it something that after each month you are assured of a steady monthly payment throughout your working life and even beyond that & you become a slave of that habit! Trust me you won't, because when it becomes a habit, you will never feel the kick in your brain for doing various other activities with your money by virtue of which you can become financially stronger person. Complacency will silently kill your other capabilities. I was personally engaged in government job for 2 years – for the West Bengal Government. While that was the default choice considering the family situation and social traditions; life had other plans for me. And precisely due to my “straying off” – today I am delivering this talk in front of you.

People who live in Darjeeling or Kalimpong use to see Kangchenjunga as a mountain only, as they are habituated. But when we visit there, we started drooling for getting a glimpse of Kangchenjunga, we make strange sounds and promise to re-visit the place again in order to plunge into the magnanimity of the mountain range.

So, earning money at a regular interval cannot overtake the thrill of Entrepreneurship, where usually money comes in irregular manner. This might make you insecure, this might pain you initially but this will make you understand the value for money.

Everything is a practice. Taking risk & surviving with it is a practice & this practice will help you to shift your personality, you become wiser, your presence will definitely impact your surroundings.

For being an Entrepreneur you cannot ignore the social aspect particularly in West Bengal. Born & brought up in W.B. & thinking to become a entrepreneur is a curse.

Your family, your in laws, your friend circle will bombard you different hardest possible questions, so that you become scared, confused & ultimately drag you to normalcy, i.e. forcing you to wear the life jacket before you start sailing your boat on the vast ocean, called life. An Entrepreneur inherently knows how to

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handle such situation.

In our society the antonym of honesty is business. Entrepreneur thinks just opposite & happily remains out of the ambit of those personalities, means the service holder big bosses, who are the backbones of our society.

In service, somebody will always be there who will keep on reminding you your dos & don't, in a word, limiting you & your ability day in & day out. You may be IAS/IPS/Vet. Officer, you cannot express yourself to the fullest & never know how much capable you are.

In an Entrepreneurship you have the wings to fly freely in your domain of work, opportunities are limitless, vision can be extended beyond the box, beyond the horizon.

Let me put a full stop here. The more I say things will get Weird. Just finishing this talk with a statement – 'you are an Entrepreneur already & probably in a dormant state. Break the dormancy, push yourself from the core of the earth, stand upright just like a seedling, see the sky & remain rooted inside the earth'. Switch on the ignition key. Countdown begins 10,9,8.....

Expanding career opportunities for veterinarians in the industry

Sushanta Saha

Regional Sales Director, S & SE, Asid Bentoli Agri Nutrition India Pvt. Ltd.

Veterinary professionals today have a vast array of career opportunities beyond traditional clinical practice. The demand for veterinary expertise extends across various industries, including pharmaceuticals, animal feed, biologicals, animal production, human pharma, and financial sectors such as banking and insurance. With the right skills and knowledge, veterinarians can achieve substantial career growth, high earning potential, and industry-wide recognition.

This document outlines the extensive opportunities available for veterinarians across various industries and functions.

1. Diverse industries for veterinarians

Veterinarians are not limited to working in clinics and hospitals. Various industries actively seek veterinary expertise for different functions, including research, product development, technical services, sales, and marketing. Below are the key industries where veterinarians play a crucial role:

1.1 Veterinary pharmaceuticals and biologicals

- Manufacturing of veterinary medicines, vaccines, and biologicals.
- Research and development (R&D) for new drug discovery.
- Quality assurance and regulatory compliance.

1.2 Feed additives and nutrition

- Development and sales of feed supplements.
- Technical consultancy for livestock and poultry farmers.
- Research and innovation in animal nutrition.

1.3 Animal feed and food industry

- Feed formulation and quality control.
- Commercial feed mill operations.
- Product development for livestock, poultry, and aquaculture feed.

1.4 Animal production and farming

- Poultry and dairy farm management.
- Hatchery operations and integration processes.
- Meat production and processing industries.

1.5 Human pharmaceuticals

- Research in zoonotic diseases and biopharma.
- Clinical research and toxicological studies.
- Regulatory compliance and drug safety monitoring.

1.6 Clinical practice, consultancy and financial sectors

- Private veterinary clinics and mobile veterinary services.
- Consultancy in livestock farming and disease management.
- Veterinary roles in banking, insurance, and financial services.

2. Departmental opportunities in the private sector

In corporate and industrial settings, veterinarians contribute to various departments, utilizing their technical expertise in both business and scientific roles.

2.1 Sales and marketing

- Product sales for pharmaceuticals, feed additives, and veterinary diagnostics.
- Client engagement and business development.
- Product promotion and marketing strategies.

2.2 Research and development (R&D)

- Drug discovery and formulation.
- Development of vaccines, biologicals, and nutraceuticals.
- Conducting field trials for new veterinary products.

2.3 Laboratory services

- Diagnostic testing and disease monitoring.
- Quality control for animal feed, medicines, and biologicals.
- Toxicology and residue analysis.

2.4 Technical services

- Providing on-field support for livestock farmers and veterinarians.
- Troubleshooting issues related to feed, health, and management.
- Educating farmers and industry professionals about veterinary products.

2.5 Clinical research

- Conducting research on animal diseases and drug efficacy.
- Veterinary involvement in clinical trials for pharmaceuticals.
- Biopharmaceutical studies related to animal health.

2.6 Business operations

- Overseeing the production and supply chain of veterinary products.
- Managing financial, strategic, and administrative functions.
- Handling partnerships and collaborations with industry stakeholders.

2.7 Processing and manufacturing

- Production of feed, vaccines, and pharmaceuticals.
- Quality control and compliance with regulatory guidelines.
- Developing innovative formulations for animal health.

2.8 Practice and consultancy

- Independent consultancy for livestock and pet industries.

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- Advisory roles in government projects and NGOs.
- Establishing private veterinary hospitals and mobile clinics.

3. Sectorial opportunities for veterinarians

Veterinarians can specialize in various sectors, depending on their interests and expertise. The key sectors where veterinarians have promising careers include:

3.1 Poultry industry

- **Feed mill and nutrition:** Feed formulation, quality control, and nutrition management.
- **Hatchery operations:** Managing breeder farms, hatchery techniques, and chick quality control.
- **Farm management:** Overseeing broiler and layer poultry production.
- **Processing and sales:** Chicken processing, value addition, and sales.
- **Veterinary pharmaceuticals and additives:** Sales and technical services for poultry health products.
- **Research and development:** Conducting feed trials, vaccine efficacy studies, and disease research.

3.2 Ruminant and companion animal industry

- **Feed and nutrition:** Developing and marketing feed formulations for cattle and pets.
- **Dairy farm management:** Handling milk production, cooperative operations, and processing.
- **Veterinary services:** Private practice, AI (Artificial Insemination), and consultancy.
- **Pet healthcare:** Establishing private clinics, pet hospitals, and diagnostic labs.
- **Research and innovation:** Advancing veterinary medicine and companion animal care.

3.3 Emerging sectors

- **Aquaculture:** Feed development, health management, and nutrition consultancy.
- **Human and veterinary pharma:** Clinical research, biosimilars, and vaccine development.
- **Financial and banking sector:** Agricultural finance, livestock insurance, and financial consultancy.
- **Entrepreneurship and startups:** Establishing innovative businesses in animal health, feed, and nutrition.

4. Additional career avenues for veterinarians

Veterinarians also have opportunities in non-traditional sectors that utilize their scientific knowledge and expertise in business development.

4.1 Rural banking and agricultural finance

- Working in financial institutions supporting livestock farmers.
- Assisting in credit assessment for dairy and poultry businesses.
- Consulting on farm investment and risk management.

4.2 Livestock and pet insurance

- Evaluating claims related to livestock mortality and diseases.
- Managing risk assessment for poultry and pet insurance.
- Providing expert opinions for insurance companies.

4.3 Clinical research and biopharmaceuticals

- Toxicological studies and regulatory approvals for new drugs.
- Investigating zoonotic diseases and antimicrobial resistance.
- Researching biosimilars and veterinary vaccines.

4.4 Sales, marketing and product management

- Marketing veterinary pharmaceuticals, vaccines, and nutritional products.
- Handling customer relations and business development.
- Conducting market analysis and competitor research.

4.5 Private veterinary business

- Establishing private veterinary clinics and hospitals.
- Offering specialized services in artificial insemination and embryo transfer.
- Launching mobile veterinary services and diagnostic labs.

4.6 Aquaculture and allied sectors

- Providing technical expertise in fish and shrimp farming.
- Conducting R&D for aqua feed and health supplements.
- Managing disease outbreaks and health monitoring.

4.7 Startups and entrepreneurship

- Innovating in pet care, nutrition, and online veterinary services.
- Developing AI-based veterinary diagnostics and telemedicine.
- Creating sustainable and eco-friendly animal health products.

5. Why choose a career in veterinary industry?

Veterinarians in industrial sectors enjoy multiple benefits, including:

- **High salary and perks:** Competitive compensation in pharma, R&D, and corporate roles.
- **Continuous career growth:** Opportunities for promotions and professional development.
- **Technical knowledge expansion:** Gaining exposure to advanced veterinary sciences.
- **Diverse career paths:** Flexibility to move across different sectors and industries.
- **Professional and social impact:** Contributing to animal welfare, food safety, and public health.
- **Limitless opportunities:** Sky is the limit for veterinarians willing to explore and grow.

Conclusion

Veterinary professionals today are no longer confined to traditional clinics and farms. The industry has evolved, offering diverse career opportunities across **pharmaceuticals, animal nutrition, production, financial services, and research**. Whether in **sales, R&D, consultancy, or technical services**, veterinarians play a crucial role in ensuring animal health and welfare while also driving innovation and business growth. For veterinarians seeking **career expansion, high earning potential, and continuous growth**, the industry presents **unlimited possibilities**.

For more information, visit **www.bentoli.com**.

Synopsis of the Workshop

The animal health care profession plays an essential role in India's economic and industrial development, particularly in the livestock and agriculture sectors. With over 70% of the rural population engaged in agriculture and animal husbandry, formal and informal animal health care professionals serve as the backbone of livestock management, disease control, and productivity enhancement. The importance of the profession has enhanced recently many folds in the context of emerging pandemic zoonoses and antimicrobial resistance which needs a One Health approach for effective mitigation, as well as to maintain environmental sustainability. The expertise of veterinarians extends beyond clinical practice to embrace food safety, public health, biotechnology, and entrepreneurship. Currently, science is considered an important discipline around the world and there is a steady demand for professionals. However, career planning is a crucial step that can determine the direction of one's professional life and prospects. To effectively prepare for a career, focus on self-assessment, skill development, gaining practical experience, knowledge about available technologies and a mentality to be ready always for active learning.

On this background, the *Indian Journal of Animal Health* organized a career counseling workshop on 10th April, 2025 at the West Bengal Veterinary Council auditorium, Belgachia, Kolkata – 700037, West Bengal as a professional responsibility for undergraduate/ postgraduate/ Ph.D. students of Veterinary and Animal Sciences, and junior veterinarians working under MVC/MVU to show them an impression of what is present at the end of the journey they have started. In total 95 students participated in the workshop. Twenty-eight experts were attending the programme physically and three experts delivered lectures online. The workshop began with the welcome speech of Prof. P. K. Das, Editor in Chief, IJAH. Chief Guest Dr. B. N. Tripathy, Honorable Vice Chancellor, SKUAST-Jammu (online) and Guest of Honour Dr. A. Sur, Eminent Dairy Consultant set the tune of the programme with the quote 'You have to chase the ball to play'. Dr. T. K. Dutta, Honorable Vice Chancellor, West Bengal University of Animal and Fishery Sciences, Kolkata inaugurated the workshop. He welcomes all the participants to attend such a programme where they can get their path in future. He stressed being passionate and emotional about the subjects to gain success other than intelligence



Dr. T. K. Datta, Honourable Vice-Chancellor, WBUAFS inaugurated the Workshop with releasing the compendium

and thanked the Editorial Board and Publication Board for organizing the programme as a professional responsibility. Dr. N. R. Kole, General Secretary, West Bengal Veterinary Association thanked all in the inaugural programme on behalf of the publishers of the journal. Dr. Alope Mukherjee coordinated the session. The workshop was sub-divided into four modules, like *Scope of Technology Transfer, Skill Development, Academics and Research, Industry and Entrepreneurship*, which were illuminated with renowned experts of the concerned field

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from the country and beyond. The doubt-clear sessions with the experts took place after the lectures were enthusiastically taken part by the participants as per their selected module. A brief report of the workshop was placed by Dr. G. Mondal, Secretary, Publication Board, IJAH; Prof. B. Roy, Former Chief Editor, IJAH expressed the utility of such a programme.

The workshop was concluded with the remarks of Dr. I. Samanta, Executive Editor, IJAH; and the vote of thanks from Dr. T. K. Adak, Chairman, Publication Board, IJAH. Dr. Srinibas Das coordinated the session.



Prof. P. K. Das, Editor-in-Chief, IJAH welcomed the dignitaries, participants and the organizing team in Inaugural Session



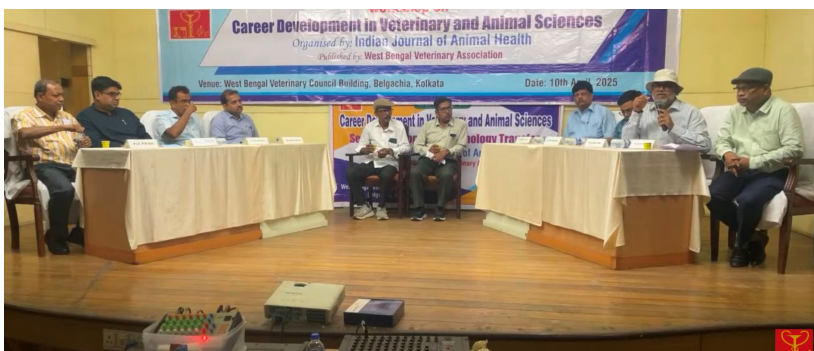
**Chief Guest: Dr. B. N. Tripathi
Vice-Chancellor, SKUAST-Jammu delivering his speech (Online)**



Dr. T. K. Datta, Honourable Vice-Chancellor, WBUAFS delivering the Inaugural Speech



**Dr. Nilratan Kole,
General Secretary,
West Bengal Veterinary
Association on behalf of the
publisher delivering the
speech**



Concluding session of the workshop

Recommendations of the Workshop

Since independence, India's livestock sector has grown tremendously due to government initiatives, scientific advancements, and policy reforms. The White Revolution, veterinary healthcare improvements, and research institutions have played a pivotal role in enhancing milk, meat, and egg production, increasing rural incomes and employment. Veterinarians have been in a central role in this transformation by implementing disease control programmes, improving breeding techniques, and supporting livestock-based industries.

The following are recommended from the workshop.

1. Scope of Technology Transfer: In this session, reputed speakers, like Dr. Divakar Hemadri, Prof. A. Goswami, Prof. S. Batabyal, Dr. S. Bhattacharya under the chairmanship of Dr. S. M. Deb and co-chairmanship of Dr. Arun Kumar Das explained the expanding horizons in veterinary and animal sciences, involving the application of research findings and innovations to practical and commercial uses. Examples include but are not restricted to affordable diagnostics, indigenous vaccines, therapeutics for local clinical conditions, addressing antimicrobial resistance with alternative therapy, reproductive biotechnology like AI/IVF, fortified feed, integrated disease



**Chairman, Co-Chairman, Speakers and Coordinator of
Session 1: Scopes of Technology Transfer**

surveillance program with One Health approach, transforming veterinary education including e-learning platform, climate resilient breeding policies, waste management solutions, entrepreneurship and start-ups like telemedicine platform, biotechnology venture, equipment and tool manufacturing, and supporting wildlife health and conservation. They felt to introduce need based short term course by the Veterinary Universities/Research Institutes for the serving veterinarians. Dr. Joydip Mukherjee coordinated the session.



**Chairman, Co-Chairman, Speakers and Coordinator in the
Workshop of Session 2: Skill Development**

2. Skill Development: In this session the reputed speakers, like Dr. S. Chatterjee and Dr. G. Mondal under the chairmanship of Dr. S. Banik and co-chairmanship of Dr. C. K. Jana explained how artificial intelligence-based tools are used for better disease surveillance and monitoring of the livestock, especially wildlife and how the informal animal health care providers or farmers in a remote place can work for better animal health under the mentorship of experienced formal veterinarians.

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Blockchain for livestock traceability ensures transparency and trust in food systems. Practical training in embryo transfer, artificial insemination, ultrasonography, and genetic improvement methods empowers professionals to revolutionize animal productivity. Automated dairy farming systems optimize operations, reduce labor-intensive processes, and enhance production. Green livestock production, focusing on eco-friendly methods, is gaining momentum in developed countries to combat environmental challenges and promote sustainability. Dr. Shamik Polley coordinated the session.

3. Academic and Public Service Opportunities: In this session, the reputed speakers, like Dr. R. Banerjee (Germany) (online), Dr. S. Dutta, Prof. S. N. Joardar under the chairmanship of Prof. S. K. Nandi and co-chairmanship of Prof. C. Debnath explained that for academic and public service opportunities basic



Chairman, Co-Chairman, Speakers and Coordinator in the Workshop of Session 3: Academic & Public Service Opportunities

requirement is B.V.Sc. & A.H. degree. Dr. Ayan Mukherjee co-ordinated the session.

4. Industry Role and Entrepreneurship: In this session, the reputed speakers, like Dr. B. Chaudhuri and Dr. S.

Saha under the chairmanship of Prof. S. Biswas and co-chairmanship of Dr. T. K. Ghoshal explained that currently various industries actively seek veterinary expertise for different functions, including research, product development, technical services, sales, and marketing. Examples include but are not restricted to the manufacturing of veterinary medicines, vaccines, and biologicals, research and development (R&D) for new drug discovery, quality assurance and regulatory compliance, development and sales of feed



Chairman, Co-Chairman, Speakers and Coordinator of Session 4: Industry Role and Entrepreneurship

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supplements, technical consultancy for livestock and poultry farmers, poultry and dairy farm management, hatchery operations and integration processes, meat production and processing industries. Emerging opportunities include working in financial institutions supporting livestock farmers, assisting in credit assessment for dairy and poultry businesses, consulting on-farm investment and risk management, evaluating claims related to livestock mortality and diseases, and managing risk assessment for poultry and pet insurance. Dr. Ruma Jas coordinated the session.

The participants expressed that it was an eye-opener programme in their feedback form. They were satisfied to join the workshop and suggested to organize every year.

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Glimpse of the Workshop



Speaker of Session 1: Prof. Arunasis Goswami, Department of VAHEE, WBUAFS delivering the speech



Speaker of Session 1: Dr. Subir Bhattacharya, Eminent Veterinary Consultant delivering the speech



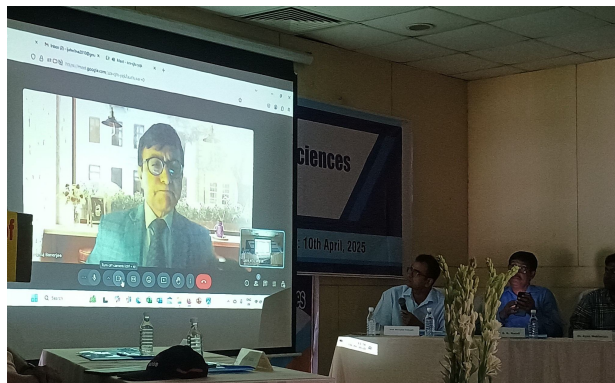
Speaker of Session 1: Prof. Subhasis Batabyal, Department of Veterinary Biochemistry, WBUAFS delivering the speech



Speaker of Session 2: Dr. Sourav Chatterjee, Sub Divisional Magistrate, Durgapur delivering the speech



Speaker of Session 2: Dr. Goutam Mondal, Principal Scientist, ICAR-NDRI, Karnal delivering the speech



Speaker of Session 3: Dr. Ramanuj Banerjee, Counsellor (Science & Technology), Embassy of India, Germany delivering the speech (Online)

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Speaker of Session 3: Dr. Sujit Dutta, Joint Commissioner, Animal Husbandry, Government of India delivering the speech



Speaker of Session 3: Prof. Siddhartha Narayan Joardar, Professor, Department of Veterinary Microbiology, WBUAFS delivering the speech



Speaker of Session 4: Dr. Bhaskar Chaudhuri, Managing Director, Liebigs Agro Chem Pvt. Ltd delivering the speech



Speaker of Session 4: Dr. Sushanta Saha, Regional Sales Director, S & SE Asia, Bentoli Agri Nutrition India Pvt. Ltd delivering the speech



Dr. Gour Hari Mondal, Secretary, Publication Board, IJAH present the brief report of the Workshop

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Dr. Tuhin Adak, Chairman, Publication Board, IJAH delivered vote of thanks in the concluding session



Part of participants attending the Workshop



Participants attending the Workshop on Skill Development



Participants attending the Workshop on Industry Role and Entrepreneurship

On behalf of West Bengal Veterinary Association

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