

# A quantitative analysis of the supply and demand of veterinary manpower in India: implications for policy decisions

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## Summary

The objective of this study was to estimate and forecast the supply and demand of veterinary manpower in India. Intake numbers of veterinary students and numbers of graduates and postgraduates were collected for the period 1997 to 2007. Based on the annual growth rate, the demand and supply for the years 2015 and 2020 were predicted. Between 1997 and 2002 the average annual number of veterinary graduates was 1,675. This increased to 1,707 between 2002 and 2007, with a marginal growth rate of 1.87%. With a growth rate of 1.87% in graduates, and 4.5% growth rate in the Indian livestock sector, the number of additional graduates required to fill the gap between supply and demand for the years 2015 and 2020 would be 1,710 and 2,364, respectively. The annual postgraduate requirement for education and research and development is 310. However, between 2002 and 2007 the average annual number of veterinary postgraduates was 995, with a growth rate of 5.3% when compared with the period between 1997 and 2002, indicating a more than three-fold surplus. With a 5.3% growth rate in postgraduates and 4.5% growth rate in the livestock sector, the surplus postgraduates available by 2015 and 2020 will be 1,027 and 1,316, respectively. The study revealed that India is training fewer veterinary graduates and more postgraduates than the system requires. Therefore, it is recommended that attention and resources be directed to the expansion of professional undergraduate veterinary education, while postgraduate veterinary education should be contained and consolidated.

## Keywords

India – Veterinary education – Veterinary human resource planning.

## Introduction

The disciplines of veterinary and animal sciences were well developed in India as early as 1500 BC. The world's first veterinary hospital on record existed during Ashoka's regime, in 304 to 232 BC (1). However, modern veterinary instruction in India began with a diploma course in 1862 at Pune in an army veterinary school, followed by others at Bombay (1886), Calcutta (1893), Madras (1903) and Patna (1930). The Bachelor of Veterinary and Animal Science degree course was first offered at Madras Veterinary College in 1935. At the time of Indian independence in 1947, there

were only nine veterinary colleges in India. Many veterinary colleges were established after independence, transforming veterinary education into a mass education system. This can be considered the most crucial stage in the development of veterinary education in India (2). With the enactment of the Indian Veterinary Council Act in 1984, a new era began. The Veterinary Council of India (VCI) introduced uniform minimum standards for the Bachelor of Veterinary Science and Animal Husbandry (BVSc & AH) programme throughout the country from 1994 onwards. A brief description of India's current veterinary and animal science education system is given in Box 1 (2).

**Box 1****The veterinary and animal science education system in India****Degree awarded**

Bachelor of Veterinary Science and Animal Husbandry

**Entry qualification**

Higher Secondary (10+2<sup>(a)</sup>) examination or equivalent in biology stream

**Admission**

Based on All India entrance test by VCI for 15% of seats and by state entrance tests for 85% of seats

**Number of colleges**

44 (42 government and two private colleges)

**Duration**

Five academic years (10 semesters<sup>(b)</sup>) including compulsory internship of six months' duration

**Credits and teaching hours**

177 credits<sup>(c)</sup> (101 theory and 76 practical credits) with approximately 5,000 teaching and practical hours in five years

**Curriculum**

Core courses, tracking programmes, study circle, entrepreneurial training, internship, and competence in skills

**Major disciplines and credits**

- *Basic sciences* (31 credits)
  - Veterinary anatomy (13 credits)
  - Veterinary physiology and biochemistry (18 credits)
- *Production sciences* (38 credits)
  - Animal nutrition (9)
  - Animal genetics and breeding (9)
  - Livestock production management (14)
  - Livestock products technology (6)
- *Para-clinical sciences* (41 credits)
  - Veterinary pharmacology and toxicology (10)
  - Veterinary parasitology (9)
  - Veterinary microbiology (10)
  - Veterinary pathology (12)
- *Clinical sciences* (40 credits)
  - Veterinary gynaecology and obstetrics (7)
  - Veterinary surgery and radiology (9)
  - Veterinary medicine (15)
  - Veterinary public health and epidemiology (9)
- *Social sciences* (7 credits)
  - Veterinary and animal husbandry extension (7)
- *Time spent at the veterinary clinical teaching complex* (18 credits)
- *Time spent working on the livestock farm* (2 credits)

**Requirements for licensure**

Completion of internship and registration with VCI or with respective state veterinary council

VCI: Veterinary Council of India

a) 10 years of primary and secondary education plus 2 years of higher secondary education  
 b) A semester is a period consisting of a minimum of 100 instructional days, excluding examination days  
 c) A theory credit hour is a lecture class of 1 h/week. A practical credit hour is a weekly class of two hours or a working period of three hours in the veterinary clinical teaching complex or livestock farm

## Need for veterinary human resource planning

Veterinary graduates and postgraduates constitute the most important skilled human resource inputs for livestock development. The growth achieved in the Indian livestock sector has been attributed, at least partially, to the concerted efforts of available skilled veterinarians. However, the situation has changed over the years, with the development of a shortage of trained veterinarians to provide technical services (3, 4). To meet the needs of an expanding livestock sector, individuals with at least a basic degree qualification in veterinary science and animal husbandry are required. This increase in demand has led to serious debate and a reconsideration of the veterinary education system. The complexity of the human resource supply-and-demand process needs to be analysed in detail in order to assess the impact of various contributory factors and the policy options for veterinary human resources.

## Methodology

Data on the intake of students and the numbers of graduates and postgraduates were collected for the period 1997 to 2007 from all veterinary colleges in India and from the Indian Veterinary Research Institute and the National Dairy Research Institute. Based on the annual growth rate, the expected demand and supply of graduates and postgraduates were estimated for the years 2015 and 2020. In addition, secondary data were collected from the Education Division of the Indian Council of Agricultural Research (ICAR), the Department of Science and Technology (DST), the National Academy of Agricultural Research Management (NAARM) and the Institute of Applied Manpower Research (IAMR).

## Results and discussion

The average annual intake of BVSc & AH students between 1997 and 2002 was 2,432. This increased to 2,479 between 2002 and 2007, with an average growth rate of 1.97%. The average number of students graduating between 2002 and 2007 was 1,707, in comparison with 1,675 between 1997 and 2002, with a marginal growth rate of 1.87%. However, the number of new graduates required each year to maintain 50,000 field veterinary institutions for the livestock and poultry sectors in India is 2,500 (5). Further, the annual growth rate in the livestock sector has been 4.5%, with related employment absorption capacity of more than 2,500 graduates *per annum*. With a growth rate of 1.87% in the number of veterinary graduates and a 4.5% growth rate in the livestock sector, the additional

veterinary human resource (in excess of 2,500) required to fill the supply–demand gap in 2015 and 2020 is predicted to be 1,710 and 2,364, respectively (Table I).

In contrast to this, the number of postgraduates is high. The research and development (R&D) institutions and education systems in the public (1,044 scientific positions in ICAR and 3,145 teaching positions in veterinary colleges) and private sectors annually require 310 postgraduates (5). However, there were 995 postgraduates during the period 2002 to 2007, which is more than three times the required number. With a growth rate of 5.3% in the number of postgraduates and a 4.5% growth rate in the livestock sector, the number of surplus postgraduates available by 2015 and 2020 is predicted to be 1,027 and 1,316, respectively (Table II).

India has 42 veterinary colleges in the public sector and only two colleges in the private sector (6). Consequently, as in the case of education systems in medicine, engineering and management, private entrepreneurs need to be motivated to participate in veterinary education (7). To look after a huge livestock population and to fill positions in 50,000 academic, R&D, extension and field institutions, India needs a total of 72,000 veterinarians, in comparison with the current availability of about 43,000 (8). To fill this gap, the annual number of graduates should be at least 2,500 according to data from DST (5), and 2,550 according to NAARM and IAMR (8).

**Table I**  
**Growth in the annual average intake and graduation rates of veterinary students**

Period	Undergraduates		Postgraduates (all disciplines)	
	Intake	No. of graduating students	Intake	No. of graduating students
1997 to 2002	2,432	1,675	1,575	945
2002 to 2007	2,479	1,707	1,704	995
<b>Growth rate</b>	<b>1.90%</b>	<b>1.87%</b>	<b>8.2%</b>	<b>5.3%</b>

**Table II**  
**Projected demand and supply of trained veterinary personnel\***

Veterinarians	Year			
	2007	2010	2015	2020
<b>Graduates</b>				
Supply	1,707	1,866	2,041	2,231
Demand (absorption capability)	2,500**	3,062	3,751	4,595
Gap	-793	-1,196	-1,710	-2,364
<b>Postgraduates</b>				
Supply	995	1,153	1,458	1,844
Demand (absorption capability)	310	352	431	528
Gap	+685	+801	+1,027	+1,316

\* With an annual growth rate of 4.5% in the livestock sector

\*\* To maintain 50,000 field veterinary institutions (5)

## Conclusion and suggestions for policy

This study has revealed that India is training fewer veterinary graduates and more postgraduates than the system requires. In the light of the findings of this study, the authors suggest that attention and resources be directed to the expansion of education systems to produce veterinary graduates to fill the supply–demand gap, while postgraduate education should be contained and consolidated.

### Suggested specific policy action – 1

Admit more undergraduate students, support the establishment of new colleges and recruit faculty to meet the future professional human resource needs.

### Suggested action plan

India needs 72,000 graduate veterinarians, but the current availability is about 43,000 (8). To fill the gap, it is recommended that the student intake be increased to at least 90 per college, so that the overall intake for 42 government colleges would be 3,780. Simultaneously, faculty should be recruited and infrastructure improved, on the basis of the number of students, the credit load of graduate and postgraduate programmes, and research and outreach activities. Regular faculty recruitment based

on advertisements throughout India should be given top priority to remove regional barriers and to increase the current faculty occupancy ratio of 0.40 to 0.60 (4, 9).

### Suggested specific policy action – 2

Provide one-off central modernisation grants of 250 million Indian Rupees (INR) (US\$3.9 million) to each of the 42 government veterinary colleges to allow them to remodel classrooms and infrastructure facilities to accommodate an annual intake of 90 students.

### Suggested action plan

The contribution of the livestock sector to India's gross domestic product (GDP) is 4.07%, and it contributes about 26.84% of the value of the output from total agriculture and allied activities (10). A combined one-off central grant of 10.4 billion INR (US\$164 million) to all 42 government veterinary colleges is justifiable in view of the livestock

sector's contribution to the GDP and the contributions made by veterinarians to the livestock sector and to society. This grant should be used to remodel all laboratories and to provide five lecture halls in each college with modern multimedia facilities.

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## Analyse quantitative de l'offre et de la demande d'effectifs de vétérinaires en Inde : conséquences pour les politiques de formation

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### Résumé

La présente étude a pour objet de procéder à une estimation de la demande et de l'offre actuelles et futures d'effectifs de vétérinaires en Inde. Les auteurs ont déterminé le nombre d'inscriptions dans les écoles vétérinaires ainsi que le nombre d'étudiants ayant obtenu leur diplôme de premier cycle, d'une part, ou leur doctorat, d'autre part, au cours de la période 1997 à 2007. En se basant sur un taux annuel de croissance, les prévisions ont porté sur l'offre et la demande à l'horizon 2015 et 2020. Dans la période comprise entre 1997 et 2002, en moyenne 1 675 étudiants obtenaient chaque année leur diplôme de médecine vétérinaire. De 2002 à 2007, cette moyenne annuelle est passée à 1 707 diplômés, soit un taux de croissance marginale de 1,87 %. Avec un taux de croissance de 1,87 % du nombre de diplômés et un taux de croissance de 4,5 % dans le secteur de l'élevage en Inde, il faudrait une augmentation de 1 710 diplômés supplémentaires en 2015 et de 2 364 diplômés supplémentaires en 2020 pour combler l'écart entre l'offre et la demande. On estime à 310 le nombre annuel requis de nouveaux titulaires d'un doctorat en médecine vétérinaire (troisième cycle de l'enseignement supérieur) pour satisfaire les besoins de l'enseignement et de la recherche-développement. Toutefois, de 2002 à 2007, en moyenne 995 doctorats étaient délivrés chaque année, ce qui représente un taux de croissance de 5,3 % par rapport à la période précédente (1997–2002) et une multiplication par trois du nombre de titulaires. Avec un taux de croissance de 5,3 % du nombre

de titulares d'un doctorat de troisième cycle, et un taux de croissance de 4,5 % dans le secteur de l'élevage, les sureffectifs dans cette catégorie s'élèveront à un surplus de 1 027 titulaires en 2015 et à un surplus de 1 316 titulaires en 2020. Cette étude a montré que le nombre de vétérinaires diplômés formés par l'Inde est insuffisant pour répondre aux besoins du système, tandis que les titulaires d'un doctorat sont en sureffectifs. Les auteurs recommandent de centrer les efforts et les ressources sur le développement de l'enseignement de la médecine vétérinaire de base, et de maîtriser et consolider la formation de vétérinaires titulaires d'un doctorat.

#### **Mots-clés**

Enseignement de la médecine vétérinaire – Inde – Planification des ressources humaines en médecine vétérinaire.



## **Análisis cuantitativo de la oferta y la demanda de personal veterinario en la India: influencia sobre las decisiones normativas**

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#### **Resumen**

Los autores describen un estudio encaminado a estimar y predecir la oferta y demanda de personal veterinario en la India. Para ello se obtuvo el número de estudiantes matriculados en estudios veterinarios de licenciatura o de posgrado entre 1997 y 2007, y a partir de ahí, atendiendo al ritmo de crecimiento anual, se extrapolaron los niveles de oferta y demanda para los años 2015 y 2020. Entre 1997 y 2002 se licenciaron en veterinaria un promedio de 1.675 estudiantes al año, cifra que entre 2002 y 2007 aumentó hasta llegar a 1.707, lo que supone un índice de crecimiento marginal del 1,87%. Al comparar este índice de crecimiento con el 4,5% de crecimiento que exhibe el sector ganadero de la India, se desprende que para colmar el déficit entre la oferta y la demanda harían falta 1.710 y 2.364 licenciados más para los años 2015 y 2020, respectivamente. Las necesidades anuales de estudiantes de posgrado para ejercer labores de enseñanza y de investigación y desarrollo se cifran en 310. Sin embargo, entre 2002 y 2007 se contabilizaron en promedio 995, con un índice de crecimiento del 5,3% en comparación con el periodo 1997–2002, lo que supone más del triple del número necesario. Teniendo en cuenta que el número de posgraduados crece a un ritmo del 5,3% anual y el sector ganadero lo hace a un ritmo del 4,5%, el excedente de posgraduados disponible será de 1.027 para 2015 y de 1.316 para 2020. El estudio puso así de relieve que la India está formando a menos licenciados y a más posgraduados en veterinaria de lo que el sistema necesita. Por consiguiente, los autores recomiendan que se preste atención y se dediquen recursos a una implantación más extendida de los estudios de licenciatura en veterinaria, conteniendo y consolidando a la vez los estudios de posgrado.

#### **Palabras clave**

Enseñanza de la veterinaria – India – Planificación de los recursos humanos veterinarios.



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