

Improving the delivery of veterinary services in India

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Summary

In pursuit of effective veterinary service delivery, the objectives of this study were threefold: *i)* reduce the shortage of technical personnel in veterinary universities (VUs) and animal husbandry departments (AHDs), *ii)* identify collaborative areas between VUs and AHDs, and *iii)* build the capacity of the veterinary and animal husbandry sector.

Primary data were collected from all the 16 veterinary colleges and AHDs in five south Indian states on: *i)* student intake and the out-turn of veterinary graduates, *ii)* technical personnel – existing and required at various levels, *iii)* specific areas of collaboration where VUs and AHDs need each other and can extend support to each other, and *iv)* areas in which university faculty and field veterinarians would benefit from further training. Two focus group discussions were held with top administrators of VUs and AHDs to collect qualitative data. The results revealed that there are not enough veterinary graduates to meet the needs of the system and that there is a shortage of faculty, field veterinarians and para-veterinarians. Both focus groups identified areas for collaboration and capacity building to improve veterinary service delivery. The results conclusively demonstrated that India's veterinary service delivery is constrained, not due to a lack of organisations or programmes, but due to the inability of the organisations to collaborate with each other.

To improve the effectiveness of veterinary service delivery it will be necessary to: admit more graduate students, support the establishment of new colleges; recruit faculty, field veterinarians and para-veterinarians; remandate the Directorates of Extension at VUs to develop linkages with AHDs; allocate funds ('special central grants') for infrastructure development to all AHDs and veterinary colleges; establish one model veterinary college that follows international standards on veterinary education and create four regional academic staff training colleges exclusively for the purpose of developing the capacity of the veterinary and animal husbandry sector. Action plans to implement these recommendations are also suggested.

Keywords

Animal husbandry department – Capacity building – Collaboration – Human resource planning – India – Para-veterinarian – Veterinarian – Veterinary university.

Introduction

The importance of livestock in the sustainability of livelihoods and food security in India needs no emphasis. According to the latest livestock census, the overall contribution of the

livestock sector to India's gross domestic product is nearly 4.11%. In 2012, the country had a livestock population of 512.05 million and a poultry population of 729.2 million – an increase of 12.39% over the previous census (1). The livestock census also revealed a significant increase in the number of dairy animals (cows and buffaloes) from

111.09 million in 2007 to 118.59 million in 2012. The goat, sheep, and pig populations registered a decline of 3.82%, 9.07% and 7.54%, respectively, compared to the previous census. However, in the case of sheep and pigs, the crossbred population had increased by 1.37% and 2.80%, respectively (1). The observed pattern of growth in crossbred dairy cows, improved breeds of buffalo, sheep, pigs and poultry indicates a shift towards economically more efficient species. In the case of bovines, the incremental growth is less in populations of males compared to females, mainly because animal draught power is being replaced with mechanical power. In the case of poultry, broiler production has been more vibrant than layer production in terms of annual growth. This shows that the livestock and poultry sectors of India are both expanding and adapting to emerging socioeconomic, environmental and technological forces, with direct implications for veterinary service delivery.

Although the livestock sector is registering phenomenal growth, several challenges remain. Some of these include: a shortage in the number of veterinarians (2, 3, 4, 5), poor collaborative research–academic–extension linkages (6, 7), and inadequate skills and knowledge among university teaching staff, field veterinarians and para-veterinarians (8, 9, 10, 11, 12, 13).

All 29 states in India have a number of organisations which aim to contribute to the development of the livestock sector. Although the approaches adopted by these organisations are different, with an important variation in resource availability depending on their mandate, the goal of all these organisations is to support effective veterinary service delivery to farmers. Veterinary universities (VUs) and the animal husbandry departments (AHDs) of state governments are two such organisations; they are present in most Indian states, delivering veterinary graduates and employing a large number of these graduates, respectively. The effective delivery of veterinary services to farmers is constrained mainly by an inadequate number of graduates but also by the inability of these organisations to collaborate with each other. To improve the overall effectiveness of veterinary service delivery, an exercise was carried out with the aim of finding ways to:

- reduce the gap between the availability of and requirement for veterinary personnel in the VUs and AHDs
- identify areas for collaboration and linkages between VUs and AHDs for effective veterinary service delivery
- improve the ability of technical personnel to face the present and future challenges of veterinary service delivery in India.

Methodology

Study area and sampling

The study was undertaken following survey research in five out of 29 Indian states, namely: Andhra Pradesh, Kerala, Tamil Nadu, Karnataka and Puducherry (the latter is one of India's Union Territories, i.e. areas directly administered by central government, but for the purposes of this paper no distinction is being made). The study covered 16 out of 42 veterinary colleges (38%), five out of 29 AHDs (17.24%), 19.35% of India's geographical area and 21.36% of its livestock population.

Data collection and analysis

The primary data were collected through a survey of the VUs and AHDs in the five states. The key survey questions were on i) student intake and the out-turn of veterinary graduates, ii) technical personnel – existing and required at various levels, iii) specific areas of linkages where VUs and AHDs can support each other, and iv) areas in which university faculty and field veterinarians felt they could benefit from additional training (Tables I, II, III, IV, V and VI).

Focus group discussions

To obtain qualitative responses, two focus group discussions (FGDs) were held in Puducherry. Fifteen top administrators of the livestock sector from the five states were invited to participate in the discussions. They included vice-chancellors, deans of veterinary colleges, and directors of extension from VUs and directors and deputy ('additional') directors from AHDs. The key FGD questions related to:

- collaborative linkages between VUs and AHDs, i.e. areas in which they expect support from each other and areas in which they can offer support to each other
- continuing veterinary education (CVE) for faculty and field veterinarians
- policy measures and recommended action plans on personnel shortages, collaborative linkages and capacity building.

The primary data collected from the five states formed the basis for the discussions on policy options during FGDs.

Results and discussion

Survey results

Shortage of veterinary professionals

Student intake and out-turn

The total student intake and the out-turn of veterinary graduates from the 16 veterinary colleges in the five states

for the 2011–2012 academic year was 962 and 694 (72%) (Table I). From 2002 to 2007, the total pass rate of veterinary students in India was 68.85% (5). The overall out-turn of graduates is not enough to meet the requirements of the system.

Veterinary faculty available and required

The data from the five states indicate that there is an inadequate number of teaching staff in VUs and colleges. Of the 1,900 faculty that are required as per Veterinary Council of India norms (14), only 1,155 are currently available in the sampled 16 colleges, indicating a gap of about 40% (Table II).

At national level, India needs about 5,000 faculty members in the existing 42 veterinary colleges, but more than 44% of the faculty positions are vacant (3). Similarly, there is a huge gap between the number of veterinary scientists in position (3,050) and the number required for teaching and research across the country (7,500) (4).

Field veterinarians available and required

The data on field veterinarians indicate the availability of 7,828 against the requirement of 13,538 in the five states, which accounts for 57.82% of the required strength (Table III). These figures are based on the number of cattle units only, as per the recommendations of the National Commission of Agriculture (15), but they may go down further if the requirement for veterinarians is on the basis of the quality of animals (i.e. their productivity) and the employment capacity of the market, which depends on the livestock sector's growth rate. A similar picture is noticed in the country as a whole – only 34,500 veterinarians are employed for the field services in India against the requirement of 67,000, a gap of 49% (4).

Para-veterinarians available and required

Para-veterinarians are skilled professionals who have undertaken training in areas such as artificial insemination, first aid, administration of medicines and vaccines, and assisting veterinarians in surgical, medical and gynaecology

Table I
Student intake and the out-turn of veterinary graduates in 2012

Institution	State	No. of colleges	Intake	Out-turn
Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU)	Karnataka	4	227	163
Tamil Nadu Veterinary and Animal Sciences University (TANUVASU)	Tamil Nadu	4	266	196
Sri Venkateswara Veterinary University (SVVU)	Andhra Pradesh	5	297	203
Rajiv Gandhi College of Veterinary and Animal Sciences (RAGACOVAS)	Puducherry	1	60	42
Kerala Veterinary and Animal Sciences University (KVASU)	Kerala	2	112	90
Total	5	16	962	694

Table II
Faculty positions in veterinary universities/colleges

Institution	Faculty available	Faculty required*	Percentage occupancy
KVAFSU, Karnataka	206	496	41.53
TANUVASU, Tamil Nadu	478	574	83.27
SVVU, Andhra Pradesh	207	365	56.71
RAGACOVAS, Puducherry	58	75	77.33
KVASU, Kerala	206	390	52.82
Total	1,155	1,900	60.78

* As per the norms of the Veterinary Council of India (14)

Table III
Field veterinarian positions in animal husbandry departments

State	Veterinarians in service	Veterinarians required*	Percentage occupancy
Karnataka	1,940	2,950	65.76
Tamil Nadu	1,931	2,960	65.23
Andhra Pradesh	2,652	6,220	42.63
Puducherry	39	44	88.63
Kerala	1,266	1,364	92.81
Total	7,828	13,538	57.82

* Calculated on the basis of 5,000 cattle units per veterinarian, as per the recommendations of the National Commission on Agriculture (15)

Table IV
Para-veterinarian positions in animal husbandry departments

State	No. of para-veterinarians serving	No. of para-veterinarians required*	Percentage occupancy
Karnataka	4,950	6,220	79.58
Tamil Nadu	1,156	1,590	72.70
Andhra Pradesh	5,064	6,220	81.41
Puducherry	63	109	57.80
Kerala	2,668	2,902	91.93
Total	13,901	17,041	81.57

* Figures provided by the respective animal husbandry departments

treatments, for a maximum of ten months. The data from the five states indicate the availability of 13,901 para-veterinarians against the requirement of 17,041 – which is 81.57% of the required strength (Table IV).

Collaborative linkages between veterinary universities and animal husbandry departments

The top three areas in which VUs expect support from AHDs were: *i*) identification of field veterinary problems for research, *ii*) technology validation, testing, refinement and feedback, and *iii*) referring clinical cases and disease outbreaks for research. The top three areas of support in which AHDs expect help from VUs were: *i*) upgrading skills in very specialised clinical subjects and emerging areas through CVE, *ii*) research on vaccines for emerging diseases, fodder and feeds, and soil mapping for mineral deficiencies, and *iii*) genetic mapping and conservation of native breeds. The top three areas in which VUs were willing to extend support to AHDs were: *i*) training and capacity building through CVE programmes, *ii*) subject-matter specialists for mass contact programmes directed at large numbers of livestock owners (e.g. health/vaccination campaigns), and *iii*) technical expertise for field problems and referral/clinical services. The top three areas in which AHDs were willing to extend support to VUs were: *i*) sharing of field data and indigenous technical knowledge for research, *ii*) support for field trials and validation of technologies, and *iii*) research and internship facilities at hospitals and farms (Table V).

Capacity building through continuing veterinary education

The top three CVE areas for faculty were: *i*) teaching methodologies and extension approaches, *ii*) environmental pollution and global warming associated with livestock, and *iii*) animal welfare, public health and food safety. The top three CVE areas for field veterinarians were: *i*) utilisation of livestock by-products, *ii*) value chain development, and *iii*) regulations on food safety, sanitary and phytosanitary (SPS) standards and certification (Table VI).

Results of focus group discussions

The key outcomes of FGDs on personnel shortages, collaborative linkages, capacity building and recommended policy options are summarised in Boxes 1 and 2.

Shortage of veterinary professionals

Veterinary graduates and post-graduates constitute the most important skilled human resource inputs for AHDs and VUs, respectively, in terms of achieving the overall objective of effective veterinary service delivery. The results indicated a considerable gap between the available and required number of veterinarians in both VUs and AHDs, which is adversely affecting the delivery of veterinary services. India needs 72,000 working graduate veterinarians, but the current availability is approximately 43,000 (2). This is equivalent to 32 veterinarians per million inhabitants in India. At global level, over half of the 180 Member Countries of the World Organisation for Animal Health (OIE) have fewer than 135 veterinarians (public and private) per million inhabitants (16). To fill the gap in India, several reports have suggested that the annual production of graduates in the country should be increased from the existing figure of 1,700 to approximately 2,500 (2, 17, 18, 19). Therefore, there is an urgent need to increase the number of graduate veterinarians and para-veterinarians to meet the shortage. This can be achieved either through increasing the number of colleges or through increasing the intake in existing colleges and recruiting additional teaching staff.

Collaborative linkages between veterinary universities and animal husbandry departments

As has been said above, VUs and AHDs are the key stakeholders that are critical for effective veterinary service delivery. In the current scenario, where there is an acute shortage of veterinarians as well as other resources, it is particularly important for these two types of organisation to work in tandem and share the available resources. Several national and international experiences suggest that both VUs and AHDs could improve their performance if they collaborated and supported each other, which would

ultimately improve veterinary service delivery to livestock farmers (6, 7, 20, 21, 22). The results of this study also indicated that top administrators in both VUs and AHDs recognise their interdependence and are willing to support each other (Table V). The VUs value feedback on technology transfer and are willing to consider the views of the AHDs on curriculum development. They are also eager to partner with the AHDs on livestock-related policies. In other words, there are numerous areas where both VUs and AHDs could potentially collaborate for the improvement of veterinary service delivery. Areas where the expectations of both parties match are relatively easy to deal with immediately, but others would require more discussion and policy change. Therefore, mechanisms to promote better interaction, knowledge flows and collaboration between VUs and AHDs need to be institutionalised for effective veterinary service delivery.

Capacity building through continuing veterinary education

Adequate mechanisms for capacity building through CVE programmes do not exist at present. Among faculty and field veterinarians, the demand for capacity building is related to knowledge and skills in new or frontier areas and not to routine veterinary services, which are currently managed adequately by both VUs and AHDs. Some of the CVE needs identified by VUs and AHDs (Table VI) were also identified in several earlier reports, i.e. i) understanding the transition in livestock production systems, namely, a shift in focus from grazing to stall feeding, from social to economic issues, and from backyard to commercial/contract farming (13, 23, 24), ii) increasing demand for livestock products, adding value, trade in livestock products, SPS standards (9, 25), iii) feed and fodder scarcity, crop-residue feeding and associated greenhouse gas emissions from livestock,

Table V
Matrix of collaborative linkages between veterinary universities and animal husbandry departments

<p>Areas in which VUs expect support from AHDs</p> <ul style="list-style-type: none"> Identification of field veterinary problems for research Technology validation, testing, refinement and feedback Referral of clinical cases and disease outbreaks for research Support for field research projects Inputs for veterinary curriculum revisions Internship for students at district hospitals and farms Consultation on policy issues 	<p>Areas in which AHDs expect support from VUs</p> <ul style="list-style-type: none"> Improving skills in very specialised clinical subjects and emerging areas through CVE Research on vaccines for emerging diseases, fodder and feeds, and soil mapping for mineral deficiencies Genetic mapping and conservation of native breeds Consultancy support on managing large commercial farms Evaluation and impact studies Visioning support for faster livestock sector growth
<p>Areas in which AHDs are willing to extend support to VUs</p> <ul style="list-style-type: none"> Sharing of field data and indigenous technical knowledge for research Support for field trials and validation of technologies Research and internship facilities at hospitals and farms Conservation of native germplasm 	<p>Areas in which VUs are willing to extend support to AHDs</p> <ul style="list-style-type: none"> Training/capacity building through CVE programmes Subject-matter specialists for outreach programmes Technical expertise for field problems, referral/clinical services Diagnostic facilities Coordination of state extension activities

AHDs: animal husbandry departments
 CVE: continuing veterinary education
 VUs: veterinary universities

Table VI
Areas for continuing veterinary education

For faculty	For field veterinarians
<ul style="list-style-type: none"> – Teaching methodologies and extension approaches – Environmental pollution and global warming associated with livestock – Animal welfare, public health and food safety – Advanced clinical subjects – Management of large-scale livestock units and value chain development – Natural-resource management – Organic livestock farming – Leadership and management-development programmes 	<ul style="list-style-type: none"> – Utilisation of livestock by-products – Value chain development – Regulations on food safety, SPS standards and certification – Entrepreneurship and market intelligence – Diagnostic kits and laboratory techniques – Specialty in clinical subjects – Reducing livestock-associated greenhouse gas emissions – Fodder crisis management

SPS: sanitary and phytosanitary

Box 1**Key outcomes of focus group 1 (participants: vice-chancellors and deans of veterinary universities)**

Admit more graduate students and support the establishment of new colleges (private or public–private partnerships) with required facilities

Recruit faculty at regular intervals to meet future human resource needs

Give a one-time special grant of Rs. 50 crores (US\$ 8 million) to each government veterinary college for remodelling and infrastructure development

Seek financial support from the AHDs for the establishment of regional research laboratories to address field problems

Establish consultancy cells at each veterinary college to support the knowledge needs of AHDs and large-scale commercial farms

Create Human Resource Development (HRD) cells at VUs and AHDs for maintaining databases to identify the CVE needs of faculty and field veterinarians in terms of training and capacity building.

Box 2**Key outcomes of focus group 2 (participants: directors of animal health departments and directors of extension from veterinary universities)**

Recruit graduates at regular intervals to meet human resource needs

Periodically review the collaboration activities of VUs & AHDs on provision / refinement / adoption / discontinuation of technologies

Give feedback to VUs on emerging field problems for research solutions and support

Identify training needs and initiate training programmes

Give more field veterinarians the opportunity to take a two-year study break, on full pay, to undertake higher studies.

increasing costs of inputs and labour, emerging diseases and lack of expertise in very specialised clinical subjects (10, 12, 25, 26, 27), and iv) the changing role of veterinarians and the information needs of livestock farmers (8, 11, 23, 25).

Therefore, strengthening the skills and competence of academic staff at VUs and field veterinarians of AHDs would necessitate developing new partnerships with technical and management institutions in India and abroad. India has a number of Academic Staff Colleges which provide in-service training for teaching staff of general universities and, as articulated in one of the earlier reports of the authors, there is a need to establish such colleges for the livestock sector (18).

Conclusions, way forward for policy and recommended action plan

This study in five south Indian states revealed that India is training fewer veterinary graduates than the system

requires and that there is a shortage of faculty in VUs and of field veterinarians and para-veterinarians in AHDs, which is adversely affecting the quality of teaching and the delivery of veterinary services. Both VUs and AHDs believe strongly that each can complement and support the work of the other. The results also revealed that there is a lot of scope for collaborative linkages between the VUs and AHDs to improve various dimensions of veterinary service delivery. To meet the evolving challenges confronting the livestock sector, both veterinary faculty and field veterinarians need to develop new skills through attending CVE programmes on topics identified in this study and others.

Suggested policy on the shortage of veterinary personnel

There is a need to admit more graduate students to the existing colleges, support the establishment of new colleges, and recruit faculty to meet the human resource needs of these colleges.

Suggested action plan

To fill the gap, it is recommended that the intake of graduate students per college should be increased to 100 so that overall intake from 42 government colleges would be 4,200. We should establish new veterinary colleges and veterinary polytechnics in the private sector or under public-private partnerships to meet the shortage of veterinarians. Simultaneously, we should recruit faculty, field veterinarians and para-veterinarians and improve infrastructural facilities in both VUs and AHDs. Regular faculty recruitment based on advertising posts across the country should be given top priority to remove regional barriers and to improve the present faculty occupancy rate of 60%.

Suggested policy on collaborative linkages between veterinary universities and animal husbandry departments

The Directorates of Extension at VUs need to be revitalised with appropriate financial backing to enable them to play a major role in developing workable collaboration linkages with the AHDs.

Suggested action plan

The authors recommend that policy working groups be formed to develop synergy and convergence between VUs and AHDs. These groups, which would comprise the heads of all agencies in the livestock sector, could meet at regular intervals to share details of programmes and review collaborative arrangements that would result in 'win-win' outcomes.

Example 1

Disease investigation laboratories under the authority of AHDs screen a large number of samples. Some samples need advanced equipment and expertise for further investigation and for this they are sent to experts at VUs. Veterinary Universities have better equipment and expertise, but they screen very few samples, which gives students inadequate experience. An effective collaboration for sharing samples and expertise would benefit both and thereby contribute to the capacity of the system.

Example 2

The majority of veterinary graduates trained by VUs are absorbed by AHDs. Therefore, the input of AHDs on curriculum revision helps VUs to provide quality education to graduates.

Suggested policy on capacity development

The authors recommend allocating a one-time special central grant of US\$8 million to each veterinary college and AHD in the country and establishing academic staff colleges at regional level exclusively for capacity development in the livestock sector.

Suggested action plan

A one-time special central grant for 42 government veterinary colleges and AHDs in 29 states and seven union territories is justifiable in view of the 4.11% contribution that the livestock sector makes to India's gross domestic product and in light of veterinarians' contributions to society. These funds could be utilised to improve infrastructure facilities in VUs and AHDs for better service delivery. It should be possible to establish at least one veterinary college in the country, with 100% funding from central government, which follows international standards in graduate veterinary education, just as the Indian Institutes of Technology follow international standards for science and engineering. At present, there is no such pre-eminent veterinary college to which the other colleges can look to set the standards, nor are there any academic staff colleges to improve the skills and competence of university teaching staff and field veterinarians. Four academic staff colleges in the north, south, east and west of the country should be established to develop the skills of academics and field veterinarians, especially those at the start of their careers.

If implemented, the above three policy actions would be useful in addressing the shortage of veterinarians and para-veterinarians, improving the collaborative linkages between VUs and AHDs and strengthening the ability of faculty and field veterinarians to improve the effectiveness of veterinary service delivery in India.

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Amélioration des prestations de services vétérinaires en Inde

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Résumé

Les auteurs présentent une étude visant à améliorer la prestation de services vétérinaires efficaces, à travers trois objectifs principaux : *i)* pallier le sous-effectif des personnels techniques dans les facultés vétérinaires et les départements de production animale, *ii)* déterminer les domaines de collaboration entre ces facultés et départements, et *iii)* renforcer les capacités des secteurs de la médecine vétérinaire et de l'élevage.

Des données primaires ont été recueillies dans les 16 facultés vétérinaires et départements de production animale de cinq États méridionaux de l'Inde, sur les thèmes suivants : *i)* nombre de nouveaux inscrits et de diplômés ; *ii)* postes pourvus et à pourvoir en personnel technique à plusieurs niveaux ; *iii)* champs spécifiques de collaboration où les facultés vétérinaires et les départements de production animale sont en interdépendance et peuvent se soutenir mutuellement ; *iv)* domaines dans lesquels des formations complémentaires seraient bénéfiques aux vétérinaires enseignants et de terrain. Deux groupes de discussion thématiques ont été constitués et des cadres des facultés vétérinaires et des départements de production animale y ont recueilli des données qualitatives. L'étude a fait ressortir le nombre insuffisant de vétérinaires diplômés pour répondre aux besoins du système ainsi que la pénurie de vétérinaires enseignants et de terrain et de para-professionnels vétérinaires. Les deux groupes thématiques ont identifié des domaines où la collaboration et le renforcement des capacités permettront d'améliorer les prestations de services vétérinaires. Les résultats ont montré de manière concluante que la prestation de services vétérinaires en Inde est limitée non pas tant par le manque d'organisations ou de programmes dédiés que par l'incapacité des organisations à travailler en collaboration.

Les mesures nécessaires pour améliorer l'efficacité de la prestation de services vétérinaires sont les suivantes : intégrer davantage d'étudiants diplômés ; soutenir la création de nouvelles facultés vétérinaires ; recruter des vétérinaires enseignants et de terrain ainsi que des para-professionnels vétérinaires ; reconduire les départements de formation permanente dans les facultés vétérinaires afin de développer des liens avec les départements de production animale ; financer (par des subventions spéciales du gouvernement central) le développement d'infrastructures dans tous les départements de production animale et les facultés vétérinaires ; créer une faculté vétérinaire modèle conforme aux normes internationales sur l'enseignement de la médecine vétérinaire, ainsi que quatre centres de formation des formateurs consacrés exclusivement au renforcement des capacités des secteurs vétérinaire et de production animale. Les auteurs proposent quelques plans d'action pour la mise en œuvre de ces recommandations.

Mots-clés

Collaboration – Département de production animale – Faculté vétérinaire – Inde – Para-professionnel vétérinaire – Planification des ressources humaines – Renforcement des capacités – Vétérinaire.



Mejora de la prestación de servicios veterinarios en la India

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Resumen

Los autores describen un estudio que, con la ambición de conferir mayor eficacia a la prestación de servicios veterinarios, perseguía un triple objetivo: *i)* reducir la escasez de personal técnico en las facultades de veterinaria y los departamentos de producción animal; *ii)* determinar ámbitos de colaboración entre aquellas y estos; y *iii)* reforzar la capacidad del sector veterinario y de producción animal.

Ante todo se obtuvieron datos primarios de las 16 facultades de veterinaria y departamentos de producción animal de cinco estados del sur de la India acerca de: *i)* el número de matriculados y egresados de las licenciaturas de veterinaria; *ii)* el personal técnico existente y necesario en distintos niveles; *iii)* los ámbitos específicos de colaboración en que las facultades de veterinaria y los departamentos de producción animal se necesitan mutuamente y pueden apoyarse más entre sí; y *iv)* los ámbitos en que a los veterinarios, tanto los de universidad como los que trabajan sobre el terreno, les convendría recibir mayor formación. A fin de obtener datos cualitativos, se organizaron dos grupos de debate y reflexión formados por directivos de facultades de veterinaria y departamentos de producción animal. Los resultados pusieron de relieve que no había suficientes licenciados en veterinaria para atender las necesidades del sistema y que faltaban no solo veterinarios, tanto en la universidad como sobre el terreno, sino también paraveterinarios. En ambos grupos se determinaron una serie de ámbitos de colaboración y capacitación para mejorar la prestación de servicios veterinarios. Los resultados demostraron, de modo concluyente, que las limitaciones de que adolece la prestación de servicios veterinarios en el país no se deben a la ausencia de instituciones o programas, sino a la incapacidad de las entidades para colaborar entre sí.

Para lograr mayor eficacia en la prestación de servicios veterinarios será preciso: admitir a un mayor número de estudiantes de licenciatura; respaldar la creación de nuevas facultades; contratar a veterinarios en las universidades y sobre el terreno, así como a paraveterinarios; encomendar de nuevo a la Dirección de Extensión de las facultades de veterinaria que establezcan vínculos con los departamentos de producción animal; destinar fondos ('subvenciones centrales especiales') a la creación de infraestructuras en todos los departamentos de producción animal y facultades de veterinaria; crear una facultad de veterinaria modelo, que aplique las normas internacionales en materia de enseñanza de la veterinaria, y cuatro escuelas regionales de formación de personal universitario dedicadas exclusivamente a reforzar las capacidades del sector veterinario y de producción animal. Los autores apuntan asimismo planes de acción para poner en práctica estas recomendaciones.

Palabras clave

Capacitación – Colaboración – Departamento de producción animal – Facultades de veterinaria – India – Paraveterinario – Planificación de los recursos humanos – Veterinario.

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