Need Assessment to Identify Skill Gaps of Veterinary Professionals and Para- Professionals in Ethiopia

Final Consultancy Report submitted to the Ethiopian Veterinary Association (EVA)

By

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Executive summary

In a rapidly changing society, training and development of human work force is an activity that a country must commit to maintain a viable and knowledgeable work force. One of the approaches to maintain knowledge, skill and attitude of professionals and paraprofessionals is through designing continuous professional development (CPD) programs. CPD by definition is **all activities that veterinary professionals or para-professionals undertake, formally and informally, in order to maintain, update, develop and enhance their knowledge, skills, and attitudes towards the services they provide.** For effective designing and implementation of CPD, detail training need assessment (TNA) in terms of identifying existing knowledge and skill gaps and contents and means of delivery is very important. Running CDP without TNA can risk the initiative can either results in overdoing, doing too little or missing the point completely. Therefore, the objective of the present study was to carry out a scientific study on TNA to identify skill gaps in veterinary professionals, para-professionals and meat inspectors in three regional states in Ethiopia (Amhara, Somali and Oromia).The study utilized various approaches and steps described as follows. The first step was identification of potential training topics (tasks to be performed) by reviewing various literature and veterinary education curricula in Ethiopia by giving emphases skill-based practical training or mix of skills and knowledge. The second approach was questionnaire survey involving 221 professionals and para-professionals by using a format developed for this purpose. The respondents ranked their performance (i.e. ability to carry out specific task) and the importance of the task for their current job on the scale of one to seven (one for less well performing/importance and seven for well performing/importance) on a scale of one to seven. The third approach was interviewing key-informants: an expert working for regional veterinary service and an academic administrator working in a university.

Hazard analysis and critical control point (HACCP) was found to be a topic with a highest training gap in the domain of veterinary public health practices and research (focusing meat hygiene). Training gaps/needs identified for district level professionals and para-professionals with regard to cattle health included: rumenotomy/abdominal surgery and lameness assessment and management. Cesarean-section and pregnancy diagnosis were identified as skill gap related to clinical activities involving multi-species of domestic animals. Clinical anatomy, abdominal surgery, poultry medicine, poultry farm biosecurity, and mastitis in dairy animals were the tasks with high training gaps identified by private practitioners. The training topics ranked high by professionals working in diagnostic or research lab included: basic use of R programming environment (Free Software), basic use of statistical software, molecular diagnostic techniques, residue analysis in animal products, and laboratory equipment use or basic maintenances.

Various barriers potentially preventing professional to attend available trainings (which can considered as CPD) were the difficulty in being selected or nominated by own organization and financial constraints. For the mode of delivery of CPD under the conditions that CPD program will be implemented, many of the respondents were not in favor of E-learning. Generally, face-

to-face training (lecture type) and on-job training were preferred methods of delivery among others.

The key-informant from a regional livestock development and heath Agency/Bureau, indicated that employees are attending various courses but no mechanism to incorporate the training outcome into the job career structure of the trainees. For the success of any CPD, establishment of veterinary statutory body as a prerequisite was recommended. A similar interview with academic expert working in a university showed presence of activites related to CPD (in terms of short-term training) and offering such training is part of community and public service activities.. CPD curriculums in the form of short-term are prepared are developed based on the request from government or non-governmental organizations.

The present study is not without limitations which we could not follow formal sample size calculation and also not to involve as many key-informants as possible. This was due to the fact that there was a security problem in many parts of Ethiopia during the survey. The findings of this survey provided a baseline data for Veterinary professionals and para-professionals CPD program development.

Our key recommendations for EVA are:

- to initiate tailored-made training programs, develop CPD modules with appropriate and competent veterinary schools and professionals
- to work towards establishing Veterinary Statutory Body that exercise and enforce control over all veterinary professionals
- to work towards development of guide to define veterinary CPD structure of Ethiopia

Above recommendations are in line with 2013 Animal Health Strategy and Vision of the Ethiopian Ministry of Agriculture.

1. Introduction

It is the daily experience in witnessing a tremendous change in (veterinary) medical science due to constantly changing technology. This means, the professionals and para-professionals need to update their knowledge and skill in their areas of mandates and responsibilities (specialized duties). As the technologies are emerging, the problems are also emerging and this needs the professionals need to be equipped with updated skills and knowledge, same to their attitude. It is natural that professionals do have tendency in learning new and emerging techniques through seek for such new information and also by getting further training which can improve their competency and performance. However, all professionals may not have equal tendency in improving their professional skill or knowledge on a continual basis. This may demand formal and institutional mechanisms of monitoring and regulating the implementation of continuous professional improvements at individual or organizational levels. Formally, any activity involving towards maintaining knowledge or skill gained or getting new one is termed as continuous professional development (CPD). CPD may be defined in veterinary profession as "an interactive process by which registered veterinary practitioners enhance the skill and knowledge they had gained at the time of graduation" (Caple, 2005). CPD is the means by which professionals maintain their knowledge and skills related to their professional duties and responsibilities. CPD involves educational activity which helps to maintain, develop or increase knowledge, problem-solving, technical skills or professional performance standards all with the goal that professionals can provide better services. CPD includes 'formal' activities, e.g. courses, conferences, workshops, e-learning programs, best practice techniques and ideas sharing. Attendance of short-term skill-based training especially plays a great role.

In most countries of the world, CPD is one of the core components of the regulation and monitoring the veterinary service activities. For example, Australia, from developed countries, firs got CPD recognition in 1993 and started implementing from January 1994. From developing countries, for example, Kenya started implementing CPD in its veterinary regulation in 2013. According to the Kenyan Veterinary Board, a registered veterinary professional and para-professional needs to accumulate at least 20 and 14 CPD points, respectively in a year.

In Ethiopia, Livestock production is a cornerstone of the rural communities in terms of the provision of foods and its contribution to important economic, social and cultural roles. The animal population of Ethiopia is estimated at (59.5 million cattle, 29.5 million sheep, 30.2 million goats, 8 million equines, 1.2 million camels and 49 million poultry). Regrettably, the expected benefits from livestock are not proportional with its number and potential due to various constraints hampering the productivity. High prevalence of animal health problems and the lack of sufficiently trained workforce which can tackle the problems and subsequent poor veterinary services are one of the major constraining factors in the livestock development sector.

The Ethiopian Government in collaboration with various donors and partners is taking commendable initiatives to improve the performance of agricultural sector in general and the livestock sector in particular. Many efforts are being undertaken in improving the technical and organizational perspectives of livestock health and production management which training of professionals/para-professionals at various levels is among the activities. For the last two decades, the Ethiopian government worked out to expand training programs in higher and technical educational institutions in all disciplines including veterinary medicine. However, there is a complaint related to the quality and competency of the professionals. The skill of the professionals may not be to the standard. Professionals or para-professionals might have gained required knowledge, attitude and skill at the time of graduation but there is no mechanism in place for them to maintain or improve their competency in their practices. Therefore, the veterinary services of the country require enormous improvement in terms of regulatory support, technical back-up and institutional capacities at different levels.

Ethiopian veterinary education and practice is lacking formal regulation and monitoring due to the absence of veterinary statutory body. For example, there is no mandatory registration in the country for practicing veterinary activities. Recently, there are commendable initiatives towards establishing veterinary statutory body and subsequently formulating various regulations. As part of the initiative, recently, EVA received grant from European Union (EU) in the framework of a project titled: “The Health of Ethiopian Animals for Rural Development (HEARD Project) which aims at strengthening animal health services involving public and private sectors and

implemented in collaboration with International Livestock Research Institute (ILRI), Ethiopian Ministry of Agriculture and three Regional Agricultural Bureaus. The HEARD project aims to increase sustainable livestock productivity and improve the marketing of livestock products through enhancing quality and reliability of integrated public and private veterinary service delivery. It is expected that performance of the veterinary service will be strengthened to improve data gathering, analysis and strategic animal health interventions by both public and private sectors as part of the project. Capacity development for different stakeholders involved in animal health service delivery is at the heart of the project in which delivery of CPD to the veterinary professionals and paraprofessionals is the core component.

Improvement in animal husbandry requires periodical refreshing of skill and knowledge to make veterinary professionals and para-professionals more effective on their job. CDP plays a great role in maintaining and also improving quality of veterinary service; however, it requires a careful planning in its design and implementation to get the desired outcomes. As part of CDP planning, identifying the skill and knowledge gaps through formal need assessment is very important, which is formally called training need assessment (TNA). In medical sciences, which we can also assume for veterinary services, TNA is an ongoing process of identifying the skills and knowledge gaps of professionals. The overall purpose of TNA is to determine the status of the performance professionals and whether training is needed or not. TNA is a fundamental part of CDP if the performance of employees is going to be improved through training (Holloway et al. 2018). Running CDP without TNA is not a wise approach because of the fact an organization running the training can risk the overdoing, doing too little or missing the point completely (Brown, 2002). Therefore, it is necessary that training organizations should identify the training needs of the animal health professionals before planning any provision of modular courses or any training packages. This will minimize the wastage of efforts and maintain interest of the animal health professionals in the training. Training plays an important role in the advancement of human performance in a given situation. Training provides a systematic improvement of knowledge and skills which in turn helps the trainees to function effectively and efficiently in their given task on completion of the training. So, effective training requires a clear picture of

how the trainees will need to use the information and technology after training in place of such local practices what they have adopted before in their situation (Lynton and Pareek, 1990).

In Ethiopia, though it is highly perceived that the veterinary professionals working in different institutions lack key skills required for efficient services, formal TNA carried out so far is quite limited (may be to only internal institutional reports available).

2. Objective

The objective of the present consultancy work was to carry out a scientific study on training needs assessment to identify skill gaps in veterinary professionals, para-professionals and meat inspectors in Amhara, Somali and Oromia regions, Ethiopia.

3. Methods

3.1. Scope of the study

The present study is part of a project called "The Health of Ethiopian Animals for Rural Development (HEARD Project)" funded EU and being implemented with partnerships of EVA, ILRI, the Federal Ministry of Agriculture and three Regional Agricultural Bureaus in Ethiopia (namely Somali, Amhara and Oromia). The aim of the project is strengthening animal health services by involving public and private sectors with a final goal to increase sustainable livestock productivity and improve the marketing of livestock products through enhancing quality and reliability of integrated public and private veterinary service delivery. The present study is part of a project to carry out TNA before designing and implementation of CPD targeting professionals and para-professionals working at different organizational structure of the veterinary sector in Ethiopia. The study was carried out by involving institutional at the levels federal, regional, zonal and district level veterinary services (including abattoirs, various directorates, regional states (Oromia, Amhara and Somali), central and regional diagnostic and research or regulatory laboratories, zones in the regions, district level practitioners (both government and private). Even though the scope of the study was limited to those mentioned

above, because of similarity of the institutions in Ethiopia, it can be reasonable to consider the study covered the whole Ethiopia.

3.2. Study design

General TNA approaches available in literature were used to assess the training needs of animal health professionals working in different organizations in Ethiopia.

In terms of design, three very elaborate main approaches or steps were followed: (1) identification of potential training topics, (2) questionnaire survey to rank the performance of professionals for each identified topic and the relevance of that topic for the job position of the respondent and (3) key-informant interviews with a veterinarian working in a regional bureau of agriculture and an academic administrator working for a university.

The first approach was development of the potential topics for CDP taking into account the tasks of veterinary professionals or para-professionals working at various level of organizational structures of animal health services (public or private) and veterinary public health (performed by reviewing various literature and veterinary education curricula). The lists of potential training topics for CPD were discussed with experts and also with the Ethiopian Veterinary Association (EVA) Secretariat. Accordingly, there were various modifications reflecting the reality of Ethiopia in terms of general veterinary infrastructure and facilities. In addition, emphases were given to topics which cover skill-based practical training or mix of skills and knowledge. This was done in line with evaluation report of the performance of veterinary services (PVS) of Ethiopia (Amanfu et al. 2011). The report claimed that veterinary professionals and paraprofessionals in Ethiopia were generally well educated and motivated. On the other hand, key gaps were related to field staff technical capacity and lack of veterinary statutory body among others. The potential tasks carried out by the professionals and para-professionals were classified into: (a) meat inspection (veterinary public health) practices and research, (b) veterinary clinical practices expected to be carried out at the level of district veterinary clinics or district agriculture offices, (c) veterinary regulatory and public veterinary services (Zone, Region or Federal Agriculture Office/Ministry), (d) diagnostic or research laboratories and (e) veterinary (para)-professionals working in private clinical services (clinic and drug stores). When possible,

the clinical services were further disaggregated by domestic animal species. Finally, tasks assumed to cover cross-cutting issues were separately presented.

The second approach was a survey of the professionals and para-professionals by using a structured questionnaire format developed for this purpose.

The questionnaire format was developed by following the Hennessy-Hicks Training Needs Analysis framework already available and recommended by the World Health Organization (WHO) for the TNA of health professionals (Hennessy and Hicks, 2011). Major modification was made by incorporating the topics identified in the first stage of this study into the questionnaire. The questionnaire had three main parts: (a) basic demographic part, (b) the ranking of tasks and (c) constraints of CPD and preferred means of training delivery (attending CPD). After that the questionnaire was distributed to professionals and para-professionals working in different organizations. A cover letter which explains the objective of the study and how the collected data going to be used was attached to the questionnaire to get informed consent from each respondent.

Different techniques were applied when selecting the respondents. The overall sampling approach applied was a referral system in which we sent the questionnaire and asked the person to share with another professional. Most of the questionnaire formats were distributed via e-mail and electronically filled. Hardcopies were used in Woredas of North Shewa (Amhara Region), West Hararge, East Shewa, West Arsi Zones, and Somali Region. The number of respondents in Woredas/City administration disaggregated by region and production system is attached to as annex to this report. Each topic identified under step one above were ranked by the respondents based on two criteria: (a) self-assessed performance and (b) importance for own job context. The respondents were asked to rank their performance (i.e. ability to carry out specific task) and the importance of the task for their current job on the scale of one to seven (one for less well performing/importance and seven for well performing/importance) for each topic. A total of 221 professionals and para-professionals were involved in this need assessment. The training gap for each topic was assessed by subtracting the average of the rank given for performance from importance.

As stated above, the World Health Organization (WHO)–adopted Hennessy Hicks Training Needs Analysis Questionnaire was used to assess the tasks that are central to the role of veterinary professionals, para-professionals and meat inspection professionals. Hennessey-Hicks training needs analysis questionnaire was designed for health professionals. The questionnaire constitutes of 30 psychometrically tested questions (tasks) which can be used with or without modification (addition or deletion of about 10 questions are possible). For our case, we only used the approach and the questions (tasks) were formulated as indicated in the first step of the study design (see previous section of this method part). According to Hennessy and Hicks (2011), "training needs are identified where there are the biggest gaps between the importance attributed to a task (I) and how well the person believes to perform this task (P). The biggest gaps (D) indicate the greatest training need. This can be done for an individual or for groups".

Questions were organized into domains of competency related to (a) veterinary service delivery (mostly clinical), b) regional or central veterinary diagnostic or research services, (c) veterinary public health/meat inspection, d) epidemiological and statistical analysis often practiced at the level of national or regional offices (those involved in regulatory or coordination activities). The ranking was done by asking the respondent to complete the questionnaire by giving ranking 1 to 7 for each topic by considering two main criteria:

a) How well she/he consider currently performing activity related to the topic, 1= not well; …other numbers showing the various levels in between …; 7=very well [with range of numbers depending on your performance)
b) How important is the activity or task is to the successful performance of his/her job? Rating of 1 to 7 with 1=not at all important; …other numbers showing the various levels in between …; 7= very important [with range of numbers depending on importance)

The last part of the questionnaire was ranking the constraints of CPD and preference of the respondents how they can attend CPD.

The data from questionnaire survey was analyzed by simple subtraction of the average rank for each topic given by the respondent for importance (I) from performance (P) which gave difference (D) indicating training gap. The average of D was taken to know the training gap. The larger the value of D was the larger the training gap (this was done by disaggregating into the

different levels of organizational structure in the veterinary sector). This means if a particular task is important and the person is not well performing, training is needed but note that the numbers are only for ranks.

The third approach was the interview of expert working for regional veterinary service as key-informant. This was done to know how CPD activities can be used as part of human resource development planning in veterinary sector. More emphasis was given to the constraints and barriers and the possible solutions related to CPD. In addition, an academic administrator working in a university was also interviewed to know the availability of CPD programs and how such programs in the future can be developed and implemented. The data collected through key-informant interview was qualitative and subsequent analysis of the data was carried out through narration.

4. Results and interpretation

4.1. Results of structured questionnaire survey

4.1.1. Characteristics of the respondents

A total of 221 professionals and para-professionals were involved in this need assessment. Majority of the respondents were holding DVM, their age less than 30 years, male, working at district level and having work experience of 6-15 years. The detail of the characteristic of the respondents is depicted in table 1. Nearly about 60% of the respondents did not participate in any training since the last two years. This may indicate a clear training need in general. Moreover, given that the professionals are at their young age, the training as part of CPD can bring significant impact.

Table 1: Characteristics of respondents in the self-completed questionnaire

Factors (characteristics)	**Category**	**n**	**%**
Qualification	Animal Health Technician	11	5.0
	Diploma in Animal Health	39	17.6
	BVSc/BSc	46	20.8
	DVM	104	47.1
	Masters	21	9.5
Age (years)	<=30	90	40.7
	31-40	83	37.6
	41-50	32	14.5
	>50	16	7.2
Gender	Male	199	90.1
	Female	22	9.9
Work experience (years)	<=5	38	35.2
	6-15	48	44.5
	16-25	17	15.8
	>25	5	4.6
Institutional category where professionals work	Meat inspectors (public health)	22	10.0
	District level	108	48.9
	Zonal, Regional or Federal level or regulatory	50	22.6
	Diagnostic or Research Lab	20	9.1
	Private drug store or clinic	21	9.5

Participated in a training in the last two years	Yes	92	41.6
	No	129	58.4

4.1.2. Veterinary public health practices and research

Table 2 below depicts the training need of animal health professionals working in the area of veterinary public health practices (including public health and epidemiology related issues). The result shows that there was a high training need in many of the items (skills) assessed (positive difference in the average of the ranks between the importance of the task for current duty of the respondents and the performance. HACCP was found to be with a highest training gap and nearly there was difference of two units' level (rank) in most of the items assessed. This indicates that emphasis should be given for most of the items when planning CPD activities related to veterinary public health.

Table 2: Training need of for meat hygiene (veterinary public health) practices and/or research

S. No	Tasks or activities	P	I	D
1	Meat inspection (ante-mortem and post-mortem inspection)	3.7	6.1	2.4
2	Qualitative food safety risk analysis	2.8	5.4	2.5
3	Quantitative food safety risk analysis (microbiological)	2.2	4.9	2.7
4	Foodborne disease outbreak investigation and control	4.5	5.3	0.9
5	Food Safety value chain mapping	2.3	4.7	2.4
6	Multi-criteria decision-making tools (food safety management or prioritization)	1.6	4.5	2.9
7	Hazard Analysis and Critical Control Point (HACCP)	1.9	5.3	3.5
8	Animal and animal products trade and regulations	2.5	5.2	2.7
9	Public Health Education (zoonoses and food safety)	4.1	6.3	2.2

P: Performance; I: Importance; D: Difference (I-P)

4.1.3. Veterinary clinical practices expected to be carried out at the level of district veterinary clinics or district agriculture offices

Table 3 shows the training need for professionals working at district level, often considered as in the front-line of giving veterinary clinical or advisory services to farmers and pastoralists. Rumenotomy/abdominal surgery and lameness assessment and management in cattle health management was ranked higher in terms of training gap, demanding due attention for training. Generally, poultry medicine and biosecurity were nearly ranked at the same level. This may show a need to design training program encompassing both clinical and prevention (e.g. biosecurity) activities. With regard to general veterinary tasks or procedures involving potentially multiple animal species, there was a highest training need on the diagnosis, treatment and prevention of intoxication and the remaining items were ranked still high.

Table 3: Clinical and preventive activities in dairy, poultry and involving multiple animal species

S.No	Skill for veterinary tasks or procedures (mostly cattle farming)	P	I	D
1	Rumenotomy/abdominal surgery	3.8	5.0	1.2
2	Lameness assessment and management	4.2	5.4	1.2
3	Proper diagnosis of dairy animal metabolic diseases and treatment	4.1	5.1	1.1
4	Mastitis diagnosis and treatment (e.g. intra-mammary infusion) and prevention	4.6	5.6	1.0
5	Dehorning, hoof care (trimming), male animal castration (open)	4.7	5.4	0.7
	Skill for veterinary tasks or procedures (involving poultry)			
1	Poultry biosecurity (prevention and control)	4.5	5.9	1.5
2	Poultry medicine (focusing on diagnosis and treatment)	4.2	5.6	1.4
	Skill for veterinary tasks or procedures (similar for multiple animal species)			
1	Intoxication: diagnosis, treatment and prevention	4.1	5.9	1.7
2	Art of patient history taking and physical clinical diagnosis	4.7	5.9	1.2
3	Wound management (post-operative or accidental)	4.9	6.1	1.2
4	Local anesthesia administration and management	4.3	5.2	1.0

P: Performance; I: Importance; D: Difference (I-P)

Table 4 depicts the various animal health activities or procedures disaggregated by animal species. In ruminants, cesarean-section and pregnancy diagnosis were found to be procedures a

training needed according the result of our survey. Followed by those, the following procedures/activities were ranked as high training needs: “Animal behavior and welfare management”, “Estimation of age based on dentition and other criteria” and “urinary catheterization and treatment of urinary tract obstruction”. Cesarean-section, urinary catheterization and treatment of urinary tract obstruction, pregnancy diagnosis assisting delivery and management of dystocia were clinical procedures in which training gaps were found to be high in equines, camels and pet animals (dogs and cats).

Table 4: Veterinary clinical activities (disaggregated by major domestic animal species)

		Ruminants			Camels			Equines			Dogs/cats		
S.No	**Practices disaggregated by animal species**	P	I	D	P	I	D	P	I	D	P	I	D
1	Animal behavior and welfare management	4.1	5.7	**1.6**	3.2	4.4	1.2	4.1	5.7	**1.7**	3.4	5.0	1.6
2	Estimation of age based on dentition and other criteria	4.1	5.7	**1.6**	2.8	4.0	1.2	3.7	5.6	**1.9**	3.3	4.6	1.3
3	Clinical anatomy (knowledge of the sites of drug administration/injection, surgical incision, blood collection)	5.1	5.9	0.8	4.1	4.6	0.5	5.2	5.9	0.7	4.4	5.4	1.0
4	Determination normal physiological parameters (vital signs)	5.6	6.3	0.7	4.3	4.5	0.2	5.1	5.8	0.7	4.7	5.2	0.5
5	Cesarean-section	3.3	5.5	**2.2**	2.5	4.0	**1.4**	3.1	5.2	**2.0**	2.9	4.7	**1.9**
6	Urinary catheterization and treatment of urinary tract obstruction	3.8	5.4	**1.6**	2.6	4.1	**1.5**	3.1	5.0	1.9	2.5	4.3	**1.8**
7	Pregnancy diagnosis	4.0	6.0	**2.0**	2.6	4.3	**1.7**	2.4	4.6	**2.1**	2.2	4.0	**1.8**
8	Assisting delivery and management of dystocia	4.6	5.9	1.3	2.8	4.4	**1.6**	3.9	5.5	1.6	2.5	4.2	1.7
9	Ecto-parasite control and prevention	5.1	6.0	0.9	3.6	4.3	0.7	4.5	5.2	0.7	4.2	5.1	0.9
10	Treatment, control and prevention of internal parasites	5.1	6.0	0.8	3.8	4.8	1.0	4.9	5.9	1.0	4.2	5.3	1.0
11	Drug prescription, dosage calculation and administration	5.1	5.8	0.7	3.6	4.1	0.6	4.5	5.5	1.0	4.6	5.4	0.8

P: Performance; I: Importance; D: Difference (I-P)

4.1.4. Veterinary activities expected to be carried out at the level of Zone, Region or Federal Agriculture Office/Ministry

The training need for animal health professionals working at the level of zonal and above (regional or federal levels), mostly tasked with administrative (coordination) function was related to statistical analysis of data and project management skills (Table 5).

Table 5: Veterinary activities expected to be carried out at the level of Zone, Region or Federal Agriculture Office/Ministry (regulatory and public veterinary services)

S. No	Tasks or activities (performance areas)	P	I	D
1	Advance Statistical analysis (e.g., linear regression, logistic regression, survival analysis)	3.1	5.6	2.4
2	Basic use of R (Free software)	3.3	5.6	2.3
3	Basics of using Q-GIS or similar GIS software	3.5	5.8	2.3
4	Basic use of statistical software (STATA/SPSS)	3.4	5.6	2.3
5	Basics of spatial epidemiology	3.5	5.5	2.0
6	Introductory Geographic Information System (GIS)	3.8	5.7	1.9
7	Project management: monitoring and evaluation	4.0	5.8	1.9
8	Structured data management and analysis (descriptive)	3.8	5.7	1.8
9	Systematic literature review, appraisal and meta-analysis	3.4	5.2	1.8
10	Epidemiological Diagnostic test evaluation and interpretation	4.1	5.6	1.4
11	Animal Disease surveillance and information system	4.4	5.8	1.4
12	Qualitative livestock import risk analysis	3.8	5.2	1.4
13	Epidemiological study design and sample size calculation	4.1	5.4	1.4
14	Questionnaire design and implementation	4.3	5.7	1.4
15	Livestock Emergency Management under disaster situations	4.3	5.6	1.3
16	Participatory epidemiology (qualitative methods)	4.2	5.5	1.3
17	Quantitative livestock import risk analysis	4.0	5.3	1.3
18	Introduction to animal health economics and disease control evaluation	4.6	5.6	1.0
19	Animal disease outbreak investigation	4.8	5.8	1.0

P: Performance; I: Importance; D: Difference (I-P)

4.1.5. Diagnostic or research laboratories

Table 6 depicts the result of the questionnaire survey of professionals and para-professionals working in diagnostic or research laboratories The top-five topics in which a high training need was found in the present survey include: basic use of R (Free Software), basic use of statistical software (STATA/SPSS), molecular techniques (e.g. Polymerase Chain Reaction (PCR)), residue analysis in animal products, and laboratory equipment use and basic maintenance (listed

from high to low). Table 6 depicts the detail of the training needs of professionals and para-professionals working in diagnostic or research laboratories.

Table 6: Training needs of professionals working in diseases diagnostic or research laboratories (central or regional)

Tasks can be performed by veterinary (para)-professionals	P	I	D
Basic use of R (Free Software)	3.4	6.2	2.8
Basic use of statistical software (STATA/SPSS)	3.6	6.2	2.6
Molecular techniques (e.g. Polymerase Chain Reaction (PCR))	3.5	5.7	2.2
Residue analysis in animal products	3.2	5.3	2.1
Laboratory equipment use and basic maintenance	4.6	6.5	1.9
Serological tests and interpretation (e.g. ELISA, CFT, agglutination)	4.5	6.4	1.8
Mosquitoes collection and identification	3.3	5.1	1.8
Laboratory bio-safety and management	4.5	6.1	1.6
Collection and identification of tsetse and other flies	5.0	5.9	0.9
Hematology (e.g. blood count and blood clot test)	4.5	5.4	0.8
Veterinary cytological techniques and interpretation	3.3	4.1	0.7
Ticks collection and identification	4.6	5.2	0.6
Clinical microbiology (Gram stain and morphology, culture, biochemical identification)	5.6	6.2	0.6
Histopathology	3.8	4.0	0.2
Urinalysis	3.9	4.0	0.1
Blood examination for hemoparasites (thin and thick smear)	5.8	5.9	0.1
Coproscopy (helminthes eggs and protozoa oocyst identification)	5.5	4.9	-0.5

P: Performance; I: Importance; D: Difference (I-P)

Table 7 shows the training gap of respondents working in private veterinary service. The training need assessment result of veterinary (para)-professionals working in private clinical services (clinic and drug stores) shows that clinical anatomy, abdominal surgery, poultry medicine, poultry farm biosecurity, and mastitis in dairy animals.

Table 7: Performance and training need of veterinary (para)-professionals working in private drugs stores and/or clinics

S.No	**Task potentially performed by (para)-professionals working in private drug store and/or clinic**	P	I	D
1	Clinical anatomy (knowledge of the sites of drug administration/injection, surgical incision, blood collection)	3.3	4.9	1.6
2	Rumenotomy/abdominal surgery	3.6	5.1	1.5
3	Poultry medicine (focusing on diagnosis and treatment)	4.7	5.7	1.0
4	Poultry biosecurity (prevention and control)	4.7	5.7	1.0
5	Mastitis diagnosis and treatment (e.g. intra-mammary infusion) and prevention	4.7	5.6	1.0
6	Proper diagnosis of dairy animal metabolic diseases and treatment	4.3	5.2	0.9
7	Lameness assessment and management	4.9	5.5	0.6
8	Wound management (post-operative or accidental)	4.6	5.2	0.6
9	Dehorning, hoof care (trimming), male animal castration (open)	4.9	5.3	0.5
10	Intoxication: diagnosis, treatment and prevention	4.6	5.0	0.4
11	Art of patient history taking and physical clinical diagnosis	5.5	5.9	0.4

P: Performance; I: Importance; D: Difference (I-P)

4.1.6. Activities or tasks which can be considered cross-cutting issues

The current training need assessment for topics potentially cross-cutting in their nature showed that comparatively there was no much gap in the skill in professionals working at Zonal, Regional or Federal level and also private drug store or clinic. High gaps were identified in those working in diagnostic or research lab, and at the level of district (Table 7).

Table 8: Performance and training need of public veterinary (para)-professionals working in different organizations and levels involving disciplines of cross-cutting issues

S. No	Tasks or activities which may cover cross-cutting issues	Meat inspectors			District level (para)-professionals			Zonal, Regional or Federal level			Diagnostic or Research Lab			Private drug store or clinic		
		P	I	D	P	I	D	P	I	D	P	I	D	P	I	D
1	Knowledge and use of antimicrobials, and prevention of resistance and residues	5.1	5.4	0.3	4.1	5.4	1.3	4.6	5.4	0.8	4.7	5.6	0.9	4.5	5.5	1.0
2	Information technology literacy	3.3	5.5	2.3	3.6	5.6	**2.0**	4.4	5.5	1.1	4.1	5.8	1.7	4.3	5	0.7
3	Grant writing and/or business proposal development	3.1	6.0	**2.9**	3.7	5.7	**2.0**	4.3	5.1	0.8	3.7	5.6	**1.9**	3.6	4.6	**1.0**
4	Scientific paper writing and publication (including following the ethics)	2.7	5.4	2.7	3.8	5.2	1.5	4.0	4.5	0.5	3.9	6.0	**2.1**	3.8	4.3	0.6
5	Professional communication and working in multicultural society	5.4	5.7	0.4	4.6	5.5	1.0	5.0	5.3	0.3	4.6	5.9	1.3	4.4	5.3	0.9
6	Leadership and time management	4.2	6.5	**2.2**	4.2	5.7	1.5	4.6	5.2	0.7	4.4	5.8	1.4	4.3	4.7	0.4
7	One Health approach in disease control and prevention	3.1	6.1	**3.0**	3.9	5.7	**1.7**	5.0	5.7	0.8	4.5	5.6	1.1	4.7	5.4	0.7
8	Establishing proper relationship and communication with clients	5.4	6.1	0.7	4.7	5.7	1.0	5.2	5.4	0.2	4.6	5.8	1.3	5.0	5.5	0.4
9	Professional ethics and accountability	5.8	6.1	0.4	5.1	6.0	0.9	5.5	5.8	0.3	5.4	6.3	0.9	5.0	5.5	0.4
10	Report writing	5.0	6.7	1.7	4.9	5.7	0.9	4.8	5.4	0.6	5.4	6.4	1.0	4.7	5.2	0.5
11	Business management (public or private)	3.9	5.2	1.3	3.9	5.2	1.3	4.5	5.4	0.9	4.5	5.5	1.0	4.0	5.1	**1.0**
12	Estimate cost of service and procedures provided for client	4.1	6.0	**2.0**	4.3	5.8	1.5	4.5	5.1	0.6	4.4	5.9	1.5	4.4	5.0	0.6

P: Performance; I: Importance; D: Difference (I-P)

4.1.7. Constraints for in participating CPD

The different barriers which limit the involvement of the professionals to participate in the CPD activities were ranked and the result indicated in Table 8. Meat inspectors ranked first as a problem/barrier, the difficulty in being selected or nominated by own organization to participate in CPD activities. District level (para)-professionals ranked financial constraints as top barrier in participating in CPD provided in the form of short-term training, and the same was true for those working in diagnostic or research laboratories. Private practitioners ranked all the potential barriers in more equal levels.

Table 9: Barriers for continuous professional development (CPD), average of the rank given for each item

Barriers for CPD	Meat inspectors	District level (para)-professionals	Zonal, Regional or Federal level	Diagnostic or Research Lab	Private drug store or clinic
Shortage of time to attend existing potential CPD programs	3.7	4.7	4.4	3.7	4.1
Financial constraints to cover the cost of the training	4.0	3.2	3.0	2.2	3.5
Lack of information or awareness regarding the importance of continuous professional development	4.5	4.1	3.1	4.3	3.3
Difficulty in being selected or nominated by your organization to participate	3.1	3.6	3.2	3.6	3.7
Unavailability of CPD courses	3.2	3.8	3.0	3.1	3.0

Ranking the items from 1-7 (7: less problematic, 1: highly problematic)

4.1.8. Preference for training approaches

There was variation in the preference for methods of training delivery as indicated in Table 10. Many of the respondents in most of the categories were not in favor of E-learning. Generally, face-to-face training (lecture type) and on-job training (involving practical classes) were preferred methods of delivery among others.

Table 10: Preference for methods of training delivery by professionals working in different levels

Training approaches/methods	Meat inspectors	District level (para)-professionals	Zonal, Regional or Federal level	Diagnostic or Research Lab	Private drug store or clinic
Workshops	3.7	5.3	4.7	4.4	4.0
Availing handbook and other learning materials with self-learning	3.1	4.6	3.4	4.3	3.6
Face-to-face presentations (Lecture type)	5.0	5.5	5.0	4.4	4.5
On-job-training	4.2	5.1	4.8	4.9	5.1
E-learning	2.0	3.6	3.6	4.3	3.7
Attending conferences	3.0	3.8	4.0	3.8	4.2
Directed learning in the workplace followed by a quiz	3.5	4.3	4.2	3.4	4.6

Range of preference (1-7), 1: lowest preference, 7: highest preference

4.2. Results of key-informant interviews

As per information and opinion gathered through in-depth interview with one person working in a regional livestock development and heath Agency/Bureau, it was acknowledged that livestock is taking a leading role in Ethiopian development plan and there are many attentions to be given to the sector. There was clear response that training of professionals is needed on a continuous basis to update the knowledge and skills of them. It was stated that trainings were recently given to people working district levels, bureau level, statistical software, laboratory techniques (e.g.

microbiological and parasitological), veterinary surgical techniques and field epidemiology. The major problem stated by the informant was that even though trainings are available and significant numbers of employees attend every year, there is no mechanism to incorporate into the career structure of the trainees the outcome of the training. According to the informant, attendances of training programs are not used in assessing the career development and performance. Similarly, according to the informant, "there is no system of evaluating the performance of employees after their attendance of any training". The trainees will get certificate of attendance but there was no mechanism to give value for the certificate during promotion or salary increment or to make ot mandatory like other countries of the world. It was further added that the lack of consideration of training in the assessment of the performance and possible reward for improved performance, compromised the outcome of CPD activities. It was strongly suggested that veterinary statutory body should be established and be functional in the near future for overall veterinary practices in Ethiopia and specifically related to CPD. Moreover, there was no system of trainees report back what they learned in terms of gained skill or knowledge. Regarding the cost of training, it was indicated that in many cases the government in collaboration with other national or international partners is covering it. For the future, it would be good if online courses which can potentially minimize cost and increase accessibility can be developed and implemented. The informant iteratively mentioned that many of the things with regard to CPD in veterinary profession are lack of policy regarding its usability in human resource development and management of Ethiopia as a whole.

The interview with academic expert showed that there are few initiatives related to CPD delivery for professionals working in different organizations. The university takes CPD as part of community and public service activities in which it falls as one of its mandates, in addition to research and teaching. There are no prepared CPD curriculums but often tailored-made training programs are often developed based on request from government or non-governmental organizations.

5. Limitations of the study

The study has some limitations in terms of not following formal sample size calculation for this kind of study and also not to involve as many key-informants as possible. There was a security problem in many parts of Ethiopia during the survey which limited the movement of the consultants and also enumerators. Following the questionnaire survey and presentation of initial results to the EVA, there was plan to carry out additional key-informants interviews but this was not possible due to the current pandemic, COVID 19. Apart of the limitations, we hope that the study result greatly help CPD planning in Ethiopia.

6. Conclusion and recommendations

This study based on questionnaire survey revealed the skills gaps and the training needs of veterinary professionals and para-professionals working in different settings and organizational levels and this is summarized as follows.

1) In the area of veterinary public health practices and research (focusing meat hygiene) Hazard analysis and critical control point (HACCP) was top ranked.
2) In the area of veterinary clinical practices expected to be carried out at the level of district veterinary clinics or district agriculture offices the following topics were identified as top priority in terms of training need:
    - Rumenotomy/abdominal surgery
    - Lameness assessment and
    - Management of cattle health management
3) Similarly, the following topics in which a high gap of training need was found for those working in diagnostic or research lab included:
    - Basic use of R programming environment (Free Software),
    - Basic use of statistical software,
    - Molecular techniques (e.g. Polymerase Chain Reaction (PCR)),
    - Residue analysis in animal products, and

- Laboratory equipment use or basic maintenance (listed from high to low).

4) The need assessment for private clinical services (clinics and drug stores) revealed tasks with high training gaps:
    - clinical anatomy,
    - abdominal surgery,
    - poultry medicine,
    - poultry farm biosecurity, and mastitis in dairy animals
5) The questionnaire survey was able to identify and rank different barriers or constraints which limit the involvement of the professionals to participate in the CPD activities. Accordingly, meat inspectors followed by district level (para)-professionals, zonal, regional or federal level, diagnostic or research labs and professionals in private drug store or clinic sectors were identified in descending order in their level of participation in CPD activities. Most importantly, barriers for CPD were identified as shortage of time, financial constraints to cover the cost of the training, lack of information or awareness regarding the importance of continuous professional development, difficulty in being selected or nominated by your organization to participate and unavailability of CPD courses.

Regarding methods of delivery of potential CPD courses, despite the expansion of internet and being era of technology, the consultants revealed that e-learning was rare mode of delivery of the CPD. Most of the time face-to-face training (lecture type) and on-job training were preferred methods of delivery among others.

The result of key-informant interviews showed that:

1) in universities (higher learning institutions):
    - no standard CPD curricula were available.
    - CPD was part of community and public service activities which falls as one of its mandates, in addition to research and teaching.
2) as mentioned by the key informant from the regional livestock development bureau though trainings are given to professionals which can be considered as CPD activities,

lack of policy regarding the usability in human resource development and management of is challenging.

This document can be taken as an important guiding tool for executing short-term training manuals for professionals working at different levels of public or private veterinary services and practices. The findings of this survey provided a baseline data for Veterinary professionals and para-professionals CPD program development. **Based on the study findings, t**he following points must be taken into consideration while planning CPD programs:

- Paramount focus on topics that address timely issues as well as current market oriented clinical practices and advanced trainings that suit the 21st century to update the knowledge and skills of the professionals.

- There should be availability of online courses and more affinity to the use of internet to enable e-learning methodologies.

- There should proper monitoring and evaluation of CPD.

- EVA should be more devoted and work hard to:

    - initiate tailored-made training programs, develop CPD modules with appropriate and competent veterinary schools and professionals
    - work towards establishing Veterinary Statutory Body that exercise and enforce control over all veterinary professionals
    - work towards development of guide to define veterinary CPD structure of Ethiopia

Our recommendations based on the present study are in line with 2013 Animal Health Strategy and Vision of the Ethiopian Ministry of Agriculture which stated two key strategies related to CPD (MoA &ILRI, 2013). The strategy and vision was presented in twenty challenges and strategies.

As part of “Challenge 6: Improve efficiency and coverage of public clinical services”, CPD related strategy was presented as “Provide resources for in-service training and continuous professional development for animal health workers”.

Similarly, as per “Challenge 10: Regulate the veterinary profession and uphold professional standards and ethics”, a strategy related CPD was “Institute a system of awarding points for continuing education and make this mandatory for veterinarians in both the government and private sectors”.

7. References

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Annex 1: List of Woredas/city administrations from where the respondents obtained

Amhara Region		Oromia Region		Somali		Federal/Oromia Regional level	
woreda	**Freq.**	**woreda**	**Freq.**	**woreda**	**Freq.**	**woreda**	**Freq.**
Angolela	4	Ashmira Dereba	1	Jigjiga/Fafan	17	Federal/Oromia Regional level	27
Ankober	3	Ada'a	5				
Bahir Dar	11	Adama	6				
Bart	1	Adelle	1				
Basona	1	Akaki	5				
Basona Worana	3	Arero	2				
Chagni	1	Asella	1				
Chagno	1	Bahir Dar	1				
Debre Berhan	8	Bedele	1				
Debre Markos	3	Bedelle	12				
Dehara	1	Buno Bedelle	3				
Dessie Zuria	1	Burayu	1				
Dewa	1	Chiro	8				
Dhuhu	1	Dendi	1				
Fafan	1	Dire	1				
Finote Selam	1	Dodolla	1				
Fogera	2	Dodota	5				
Gondar	1	Dubuluk	5				
Gozam	1	Elweya	8				
Jigjiga	1	Fiche	1				
Jiru	1	Gaba Koricha	1				
Kala	1	Gadab Asassa	1				
Kombolcha	1	Gemechis	5				
Tarma Ber	3	Guna	1				
Woldia	4	Halila	1				
	57	Hamda Diksiss	1				
		Hetossa	1				
		Lume	3				
		Menagesha	1				
		Miesso	1				
		Nekemte	1				
		Robe Dida'a	1				
		Sude	1				
		Teltele	2				
		Tiyo	11				
		Tullo	8				

		Yabello	9				
		Sebeta	2		177	194	27