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Thematic Opinion

Veterinary medicine as the core of the one health approach for Nepal's preparedness to pandemics like COVID-19

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Abstract: Coronavirus disease of 2019 (COVID-19) is a declared pandemic of our time and mankind's advancement in science and medicine till now have been dwarfed and proving insufficient. It looks likely that there is no other option but to live alongside this global, deadly and multifaceted virus and many more emerging and remerging diseases. This opinion piece is a summary from review of literatures and accumulated experience of the author spanning over two decades in teaching, research and clinical setting of veterinary science. The findings stresses on established fact that: Nepal is a hotspot for many zoonotic diseases that include Avian Influenza, Rabies, Japanese Encephalitis, Leptospirosis, Brucellosis, Tuberculosis, Cysticercosis and Fascioliasis. Of the 39 zoonotic diseases reported in Nepal, viral diseases (Rabies, Avian influenza, Japanese encephalitis), bacterial diseases (Leptospirosis, Salmonellosis, Brucellosis) and parasites (Cysticercosis, Hydatidosis, Toxoplasmosis) are most notable. COVID-19 is also reported in cat, mink and zoo animals and the situation gets complex when animals like humans present asymptomatic appearance. Thus, the control mechanism for COVID-19 is incomplete without inclusion of veterinary medicine. Nepal has a huge gap between human and veterinary medicine both in teaching and clinical services. Tribhuvan University's veterinary program is historical one in Nepal and is over quarter century old. The veterinary services of Nepal are now being requested to be included as an essential service and that will add force to the One Health momentum. It is fact that humans have to live alongside evolving pathogens. Veterinary medicine as the core of One Health should be the new strategy to safeguard life and economy of any country including Nepal.

Keywords: *COVID-19; Nepal; one health; veterinary medicine; zoonosis*

सारांशः बर्तमान समयको सबैभन्दा ठुलो महामारीको रुपमा कोरोनाभाइरस रोग (कोभिड-१९, COVID-19) संसारभरी फैलेको छ । यो महामारीले मानवजातीले विज्ञान, प्रबिधि र चिकित्सा क्षेत्रमा अहिलेसम्म गरेको बिकास र प्रगतिलाई नै चुनौती दिएको छ र यथार्थमा अपर्याप्त समेत प्रमाणित गरेको छ । अब आजसम्मको अवस्था हेर्दा अहिलेको कोरोना र यसपछि आउने वा दोहोरिने रोगहरूलाई स्वीकारेर संगसंगै अस्तित्वमा रहनु वा बाँच्नुको अरू कुनै विकल्पहरु ज्याद कम देखिन्छन । यो लेखमा समेटिएका विचारहरु चाँही बिभिन्न तथ्य, अनुशन्धानका रिपोर्ट, विश्लेषण र समिक्षाहरु अनि दुई दशक भन्दा बढि अध्यापन, अनुसन्धान र पशु चिकित्साको क्षेत्रमा हासिल गरेको अनुभवका आधारमा लेखकको अनुभवको सारांश हो । अध्ययनहरु र तथ्यहरुको आधारमा नेपाल धेरै जोनोटिक रोगहरूको जस्तै एभिएन इन्फ्लुएन्जा, रबीज, जापानी एन्सेफलाइटिस, लेप्टोस्पायरोसिस, ब्रुसेलोसिस, क्षयरोग, साइस्टिकेरोसिस र फासियोलियोसिस जस्ता जुनोटिक रोगहरु, जुन पशुपन्छीहरुबाट मानिसहरुमा सर्छ, त्यसको अत्यन्तै प्रबावित स्थान हो । नेपालमा रिपोर्ट गरिएको ३९ जूनोटिक रोगहरूमध्ये, भाइरल रोगहरू (रेबीज, एभिएन इन्फ्लूएन्जा, जापानी इन्सेफलाइटिस), ब्याक्टेरिया रोग (लेप्टोस्पाइरोसिस, सल्मोनेलोसिस, ब्रुसेलोसिस) र परजीवीहरू (सिस्टेरिकोसिस, हाइडेटिडोसिस, टोक्सोप्लाज्मोसिस) सबैभन्दा उल्लेखनीय छन । कोभिड-१९ बिराला, मिङ्क र चिडियाखानामा राखीने जनावरहरूमा पनि पाईएको रिपोर्ट गरिएको छ र जब मानिसहरुले जस्तै पशुहरूले रोगका लक्षणहरु देखाउँदैन तब परिस्थिति झनै जटिल हुन जान्छ । यसैले, कोभिड-१९ को वैज्ञानिक नियन्त्रणका लागि पशु चिकित्सा क्षेत्रलाइ समावेश नगरी अपूर्ण हुन्छ । नेपालमा शिक्षण र सेवा दुबैमा मानव चिकित्सा र पशु चिकित्सा बीचको ठूलो अन्तर छ । त्रिभुवन विश्वविद्यालय अन्तर्गत पशु चिकित्सा कार्यक्रम नेपाल मै एक ऐतिहासिक कार्यक्रम हो र यो साढे दुइ दशक भन्दा पुरानो पनि हो । नेपालको पशु चिकित्सा सेवाहरुलाई पनि एक आवश्यक सेवाका रुपमा स्वीकार गर्न हिच्किचाउनु हुदैन। यसलाई समेत सगै लगेमा मात्रै मानव स्वास्थलाई पूर्ण र दिगो बनाउछ । मानिसहरु र नयाँ नयाँ रोग सधै संगसगै बाँच्नु र अगाडी बढ्नु पर्दछ । यहि नै असल हो । एकीकृत मानव स्वास्थ्यको अवधारणामा पशु चिकित्सालाई पनि समेटेर लैजाने नीति ले नै नेपाल संसारका सबै देशको सुरक्षित स्वास्थ र आर्थिक उन्नति हुनसक्छ ।

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1. Introduction

Evolution theorist Sir Charles Darwin was one of the first to speak out against the idea that humans are in anyway superior to animals. There is no fundamental difference between man and the higher mammals in their mental faculties" and that all the differences are "of degree, not of kind", Darwin (1871). He was ridiculed for that and even during those time, sarcastic cartoons of him were published (**Figure 1**). As our knowledge of disease and medical capabilities improved over the years, it's become harder and harder for parasites and microbes to thrive like they used to do in the past. It makes evolutionary sense from the microbial perspective and new viral strains would eventually develop the ability to spread secretly via asymptomatic carriers. It is scary concept, but important to realise that: we've gotten smarter, and now pathogens have as well. They have cleverly designed their survival and reproduction strategies and include various species of animals as their host. Human and animal medicine are the same, just the veterinarians have to know more as they treat multiple species. Any advance techniques use in humans are also practiced in veterinary medicine. Recently a joint team of doctors had an open heart surgery in a dog. Open-heart surgeries are more common in human patients, largely due to human hospitals' access to cardiopulmonary bypass machines, which can redirect blood flow for an extended period of time. Most animal hospitals lack this technology even in resources rich societies. This complicated surgery was a challenge as the surgeons would have to make this portion of the procedure exceptionally short. Open heart surgery is risky since the amount of time a body can survive and recover when the heart is not functioning is limited < 4 minutes, Cordova (2020). Be it the use of nano technology for vaccine against viruses, Poudel et al., 2019 or the incorporation of ancient knowledge and modern science as tailor made medicine, veterinary medicine is at the front. The concept of sustainable veterinary medicine as new era approach, Lin et al., 2003 gives momentum to the concept for One Health. The current pandemic of COVID-19 is affecting animals in many dimensions, the risk of animal borne transmission, the increasing negligence for community animals, difficulty in managing husbandry used species and many more. Besides, increasing the disease risk for COVID-19, numerous other zoonotic disease risks has also increased. Animal welfare is compromised and cost of production for animal source proteins have increased posing hardships to humans. Though, nature and wildlife may have benefited from decreased anthropogenic invasion, it is short lived and increase risks due to perception of false sense of security. Thus, it will not be wrong to say that human health focused approach alone will not work, Gautam et al., 2020. Hunger, poverty, mental wellbeing, downsizing the consumption trend as well as finding meaningful source of livelihood to millions post COVID-19 management is a Herculean task for Nepal. Agriculture, specially animal farming promises to be a likelihood option for countries like us.

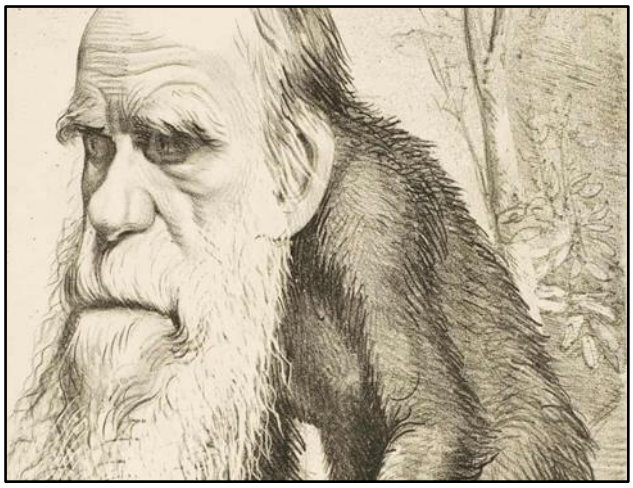


Figure 1. A caricature of Charles Darwin. The image is originally published in The Hornet magazine. It is available on University College London Digital Collections (1886). Source: https://commons.wikimedia.org/wiki/File:Editorial_cartoon_depicting_Charles_Darwin_as_an_ape_(1871).jpg

1.1. One health

The basis of One Health is that all three components; environment-animal and human health has to be envisioned in the same frame for planning and executing health policies. The World Health Organisation (WHO) works closely with the Food and Agriculture Organisation of the United Nations (FAO) and the World Organisation for Animal Health (OIE) in managing universal framework. National agencies are bound by treaties and work to promote multi-sectoral responses to food safety hazards, risks from zoonoses, and other public health threats at the human-animal-ecosystem interface and provide guidance on how to reduce these risks (https://www.who.int/news-room/q-a-detail/one-health). OIE stated that more than 60% of the existing humans' infectious and at least 75% of emerging infectious diseases of humans have animal origin and, in every year, five new human diseases appear, three of them have animal origin https://www.oie.int/scientific-expertise/biological-threat-reduction/. Environment too plays important role in disease transmission between humans and animals and with pollution on rise it is only getting worse. The link between air quality and COVID-19 is already established, Travaglio et al, 2020. The One Health triad (**Figure 2**) clearly explains the interphase as defined by the One Health Initiative Task Force

(https://en.wikipedia.org/wiki/One_Health).

Science is working tirelessly in search of solutions from trying to find biological and environmentally friendly ways to manage widely resistant agricultural pests, Shelton et al., 2020 to advocation for sustainable veterinary medicine, Lin et al., 2003 and shift in human medicine approach, deAngulo and Losada 2015. The Sustainable Development Goals (SDGs) were conceptualised and endorsed at the United Nations Conference on Sustainable Development in Rio de Janeiro, Brazil in 2012. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. The SDGs replaces the Millennium Development Goals (MDGs), which was initiated in 2000 to tackle the indignity of poverty but was not moving ahead as anticipated. The replacement of the terminology reflects acceptance to One Health and Global Village approach and sustainability as the essence. It was also an indication of universal acceptance that only sustainable goals can survive and deliver measurable, universally-agreed objectives for tackling extreme poverty and hunger, preventing deadly diseases, and expanding primary education to all children, among other development priorities.

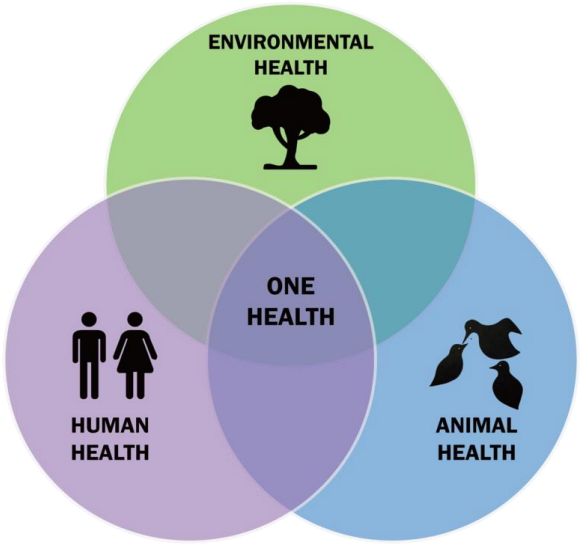


Figure 2. One Health is at the intersection of human health, animal health, and environmental health. Picture retrieved from https://en.wikipedia.org/wiki/One_Health.

1.2. One health in Nepal

The rich culture and tradition of Nepal have been founded on solid footings of वसुधैव कुटुम्बकम् (vasudhaiva kuTumbakam). This Sanskrit saying comes from the mantra VI-72 in Maha Upanishad which belongs to Asmaveda tradition. The mantra reads: अयं बन्धुरयंनेति गणना लघुचेतसाम्। उदारचरितानां तु वसुधैव कुटुम्बकम् ॥ Likewise, *our* famous mantra ॐ सर्वे भवन्तु सुखिनःसर्वे सन्तु निरामयाः । सर्वे भद्राणि पश्यन्तु मा कश्चिद्दुःखभाग्भवेत् । ॐ शान्तिः शान्तिः शान्तिः ॥ is the primordial form of what the west later explained as an One Health Concept, Kaphle (2016). Nepal has a relative advantage of being under developed and at par exposure with modern technology adaptations, Acharya et al., 2019. The space and flexibility to fall back to nature and be able to survive on minimum, the buffering protection of forested lands counts for some of the advantages. Thus, learning from the experience of developed world, we can easily reformulate our policies and strategies. The huge scope and opportunities however have their own hurdles in form of poor identification of priorities and areas of strength. Ongoing struggle with COVID-19 is an ideal example of where we stand in terms of inter agencies cooperation. The lack of respect for environment is still not realised as we see used masks and gloves litter the streets and gets dumped improperly. Medical facilities find themselves under prepared with resources and workforce. Private institutions again prove that profit is all they are after and social responsibility for them means nothing even in situation when whole country is desperate. On the other hand, veterinary medicine gets step brotherly treatment and its huge potentialities gets dusted and unrecognised. Thus, it is high time Nepal government realise that pandemics and overall achievement of the SDGs depend on how well we can harness these potentialities. Relatively small population, abundant natural resources, young work force and easy access to modern technology makes Nepal at a better position to formulate the highway ahead post COVID-19.

1.2. Veterinary Services in Nepal

Nepal is rich in its traditional knowledge and ethnoveterinary medicine of Nepal dates back to the time of Nakula and Sahadeva, the Pandava brothers. It is mentioned that the art to treat injured animals during the Mahabharata war was learnt from their hideout times in the Birat kingdom of modern day Nepal (https://tejasraval.wordpress.com/2014/12/11/pandavas-in-disguise-agyatvas-virat-parva-mahabharat/). Influenced by the knowledge of the Ayurveda, Tibetan medicine Nepal's success of animal husbandry involving multiple species of animals was possible due to tantrik traditions and bountiful medicinal plants. The first

recorded establishment of a veterinary dispensary at Kathmandu was in the year 1950 B.S (beginning of the nineteenth century in the Julian calendar). In 1940 only the present Central Veterinary Hospital was established at Tripureshwor, Kathmandu, Kaphle (2008). The suggestions for import of high producing animals to upgrade our local stock and the gift of seed stock of various animal species to His Majesty the King and the Government of Nepal also warranted evidence based medicine. Experimental farms were set up in various parts of the country and veterinarians recruited to treat the housed animals. Likewise, the districts headquarters began the setup for district livestock service office (DLSO) and manned by veterinarians. Regional level laboratory, species specific diagnostic setups recruited huge numbers of veterinarians who were all trained abroad. The DLSO's are now referred to as Veterinary hospital and Expert centres and the veterinary service is managed by the local administration, provincial and federal government. There is some overlapping and rough edges to polish but a veterinarians for every administration unit is necessary. Municipalities/Metropolitans also have the responsibility of employing meat inspectors.

1.3. Veterinary education in Nepal

The need for veterinarians increased tremendously when government formulated strategy to eradicate deadly disease like rinderpest, pursue commercialisation of livestock commodities. To fill in the gap, Institute of Agriculture and Animal Science (IAAS) of Tribhuvan University (TU) started the Bachelor of Veterinary Medicine and Animal Husbandry (BVSc and AH) course in 1992 AD. Over a period of quarter century this program have served nation in various ways and the progress made by the poultry, feed industries and dairy is directly attributed to the faculty and its products, Kaphle (2018). Private colleges too joined in like the Himalayan College of Agricultural Science and Technology (2001 AD), Nepal Polytechnic Institute (2010) and later the premise of IAAS at Rampur Campus was handed over to Agriculture and Forestry University (AFU) that too began imparting BVSc and AH education. Thus, currently this ten semester undergraduate course is offered in all four colleges and annually ~200 graduate from them. Post graduate program of this course is offered by both the public universities i.e., TU and AFU. Recently IAAS updated its undergraduate course, practical and engagement based learning is given extra weightage. Guided study circles, entrepreneurial training, tracking program are included and day one competency as demanded by the Nepal Veterinary Council is ensured, Kaphle (2018).

1.4. Current status of veterinary as an essential services

Nepal has failed to invest in the strengthening of the program. Unlike in the colonial India, where the Britishers had set up the colleges most of them evolved to be separate veterinary universities. The European system of administration and legacy of service delivery in terms of teaching, research and clinical practices failed to be initiated in Nepal. Political instability and interference inside campuses, nominal fundings, favoured appointments all acted in tandem to make the important program mere second cousin to more established agriculture counterparts and far inferior to medical science. So much so, it is for the first time that TU have realised that it also own a veterinary teaching hospital and that it comes under an essential service sector. The realisation came with notice of the hospital functioning even during the COVID-19 lockdown (**Figure 3**). It is no surprise when over fifty years of serving the nation, veterinarians are still to be recognised as an essential service providers and just recently Supreme Court of Nepal directed Government of Nepal to do so (**Figure 4**). This issue came in light as veterinarians came out to extend their expertise and skills in managing the COVID-19 chaos in Nepal. The experience of veterinarians who have successfully handled the Avian Influenza, Swine flu in Nepal were confident that the facilities created in the process could now come handy for COVID-19 detection. Four veterinary related facilities were chosen among many others inspected for the purpose of running the diagnosis facilities (**Figure 5**). The performance of service done by the four laboratories has been duly recognized by the medical fraternity in Nepal (**Table 1**).

त्रिभुवन विश्वविद्यालय

त्रि.वि. सभा तथा कार्यकारी परिषद्को सचिवालय

कीर्तिपुर, काठमाडौं, नेपाल

प.सं.स.का.प.च.नं.:

मिति: २०७६/१२/२२

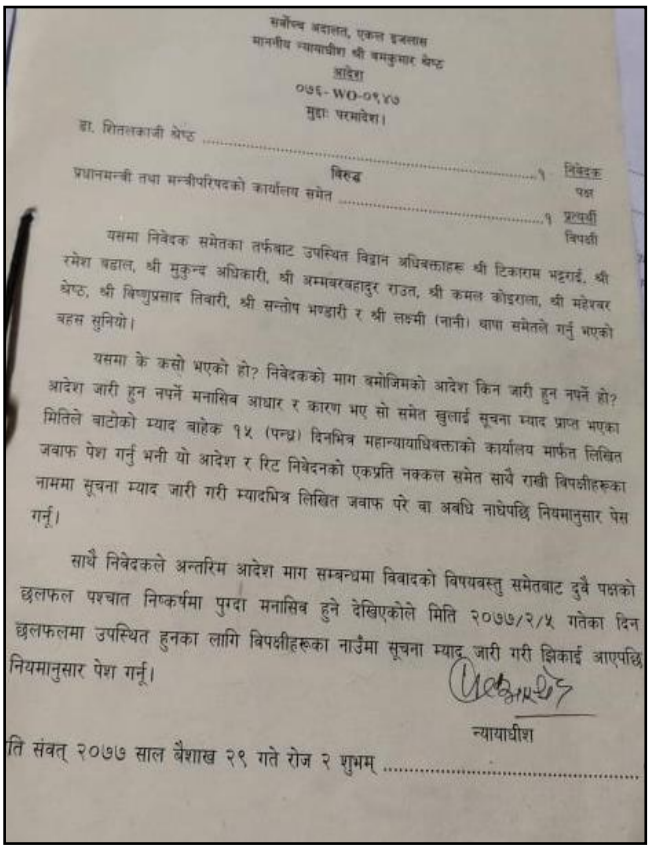
लकडाउन अवधिभर कार्यालय बन्द हुने सम्बन्धी सूचना ।

विश्वव्यापी रुपमा फैलिरहेको कोरोना भाइरस (कोभिड - १९) को नेपालमा संभावित जोखिम नियन्त्रणका लागि त्रिभुवन विश्वविद्यालयका अत्यावश्यक सेवासँग सम्बन्धित निकायहरू बाहेक अन्य सबै क्याम्पस/कार्यालयहरू २०७६ चैत्र १० गतेदेखि चैत्र २१ गतेसम्म बन्द गर्ने सूचना मिति २०७६/१२/९ मा प्रकाशन गरिएकोमा नेपाल सरकारले तोकेको लकडाउन अवधिलाई दृष्टिगत गरी सो लकडाउन अवधिभर क्याम्पस/कार्यालय स्वत: बन्द हुने भएकोले सम्बन्धित सबैको जानकारीका लागि यो सूचना प्रकाशन गरिएको छ ।

यस अवधिमा त्रि.वि.चिकित्सा शास्त्र अध्ययन संस्थान तथा कृषि र पशु विज्ञान अध्ययन संस्थान अन्तर्गतका अस्पताल एवं स्वास्थ्य सम्बन्धी निकायहरूले नेपाल सरकारको निर्णय, निर्देशन र सूचना बमोजिम गर्न गराउनु हुन र त्रि.वि.का अन्य निकायका पदाधिकारी, शिक्षक, कर्मचारीहरू आ-आफ्नो निकाय प्रमुखसँग सम्पर्कमा रहने र आवश्यक परेको अवस्थामा कार्यालयमा उपस्थित भई कार्य गर्नुपर्ने व्यहोरा समेत अनुरोध गरिन्छ ।

सूर्यप्रसाद अधिकारी
प्रमुख, त्रि.वि.सभा तथा कार्यकारी परिषदको सचिवालय
तथा प्रवक्ता

Figure 3. Thanks to Tribhuvan University for acknowledging Veterinary Teaching Hospital's importance. This Hospital with over a quarter century old history had just been another wing of the Institute of Agriculture and Animal Science. COVID-19 made this historic move to accept it at par with the Teaching Hospital of the Institute of Medicine when functioning in emergency situation.



सर्वोच्च अदालत, एकल इजलास
माननीय न्यायाधीश श्री बमकुमार श्रेष्ठ
आदेश
०७६-WO-०९४७
मुद्दाः परमादेश।

डा. शितलकाजी श्रेष्ठ .....१ निवेदक
पक्ष

विरुद्ध

प्रधानमन्त्री तथा मन्त्रीपरिषदको कार्यालय समेत .....१ प्रत्यर्थी
विपक्षी

यसमा निवेदक समेतका तर्फबाट उपस्थित विद्वान अधिवक्ताहरू श्री टिकाराम भट्टराई, श्री रमेश चन्द्राल, श्री मुकुन्द अधिकारी, श्री अम्बरबहादुर राउत, श्री कमल कोइराला, श्री महेश्वर श्रेष्ठ, श्री विष्णुप्रसाद तिवारी, श्री सन्तोष भण्डारी र श्री लक्ष्मी (नानी) थापा समेतले गर्नु भएको बहस सुनियो।

यसमा के कसो भएको हो? निवेदकको माग बमोजिमको आदेश किन जारी हुन नपर्ने हो? आदेश जारी हुन नपर्ने मनासिब आधार र कारण भए सो समेत खुलाई सूचना म्याद प्राप्त भएका मितिले बाटोको म्याद बाहेक १५ (पन्ध्र) दिनभित्र महान्यायाधिवक्ताको कार्यालय मार्फत लिखित जवाफ पेश गर्नु भनी यो आदेश र रिट निवेदनको एकप्रति नक्कल समेत साथै राखी विपक्षीहरूका नाममा सूचना म्याद जारी गरी म्यादभित्र लिखित जवाफ परे वा अवधि नाघेपछि नियमानुसार पेस गर्नू।

साथै निवेदकले अन्तरिम आदेश माग सम्बन्धमा विवादको विषयवस्तु समेतबाट दुवै पक्षको छलफल पश्चात निष्कर्षमा पुग्दा मनासिब हुने देखिएकोले मिति २०७७/२/५ गतेका दिन छलफलमा उपस्थित हुनका लागि विपक्षीहरूका नाउँमा सूचना म्याद जारी गरी झिकाई आएपछि नियमानुसार पेश गर्नू।

न्यायाधीश

इति संवत् २०७७ साल बैशाख २९ गते रोज २ शुभम् .....

Figure 4. It is sad to note that the veterinary service which is considered a global commodity by the OIE is yet to be acknowledged as an essential commodity. Recently Nepal Veterinary Association was successful in achieving the Supreme Court of Nepal's verdict in its favour that directed the Government of Nepal to include it as an essential commodity. This court order was obtained from the public discussion forum of Nepal Veterinary Council and the use of this publicly shared information is intended for strengthening the opinion of the author in this write-up

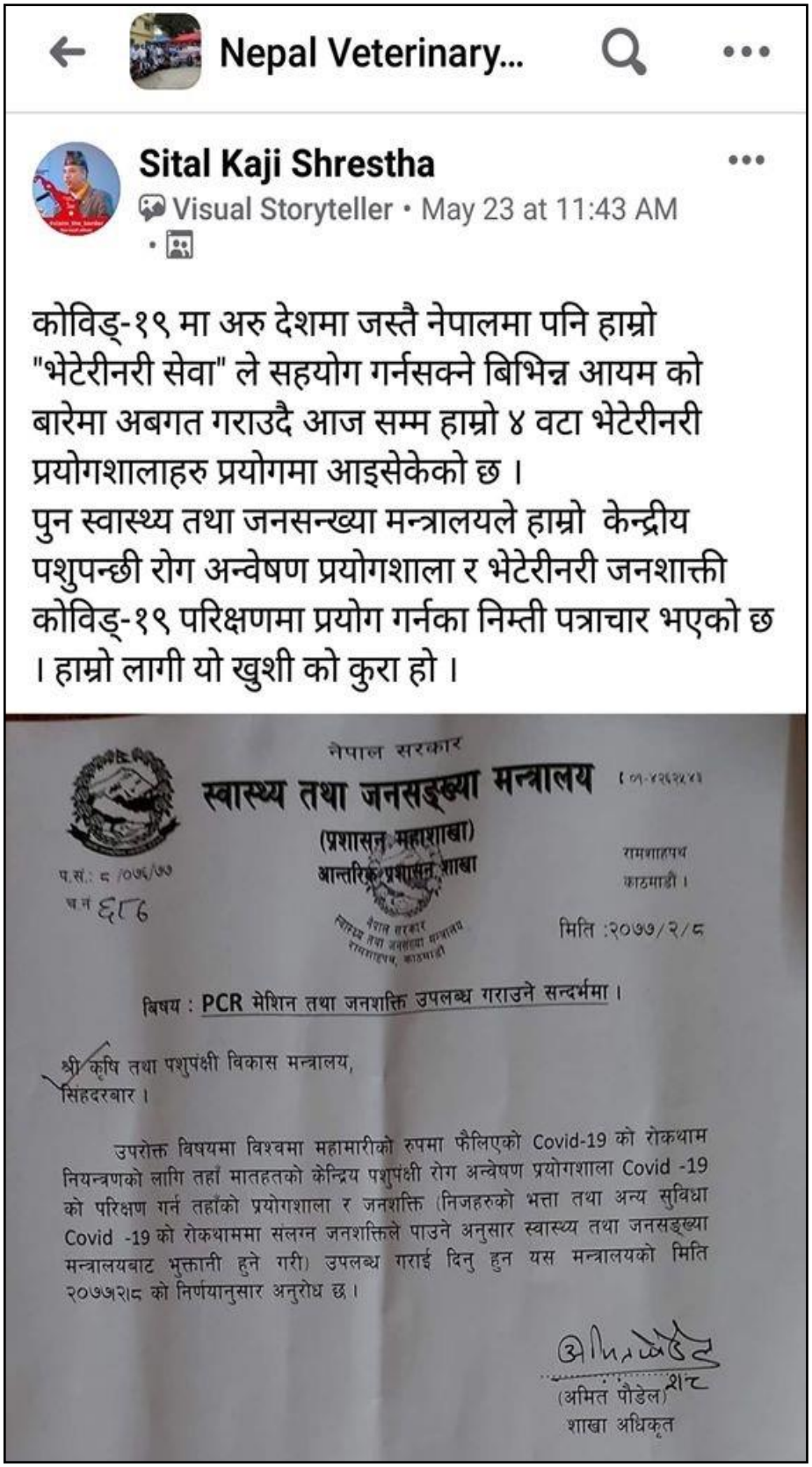


Figure 5. The initiative of the Ministry of Health and Population, Government of Nepal in including the service and facilities of the veterinary sector was acknowledged by the president of Nepal Veterinary Association. The screenshot is obtained from the public discussion forum of the association with an aim to thank the ministry and the association leadership for the great initiation..

Table 1. RT-PCR tests done in different laboratories

#	Laboratory	Total Test	New Test
A. B.	National Public Health Laboratory/ Sukraraj Tropical and Infectious Disease Hospital, Teku	17321	1064
C.	B. P. Koirala Institute of Health Sciences, Dharan	1637	93
D.	Koshi Hospital, Biratnagar	1666	47
E.	Provincial Public health laboratory/ Avian Disease Investigation Laboratory, Biratnagar ★	381	38
F.	Janakpur Provincial Hospital, Janakpur	113	
G.	Narayani Hospital, Birgunj	508	
H.	Bharatpur Hospital COVID-19 Diagnostic Laboratory / National Avian Disease Investigation Laboratory, Chitwan ★	971	101
I.	Vector Borne Disease Research and Training Centre, Hetauda	747	58
J.	Kathmandu University Teaching Hospital, Dhulikhel	1820	
K.	Patan Hospital, Lalitpur	157	24
L.	Bir Hospital, Kathmandu	424	58
M.	Pokhara Academy of Health Science, Pokhara	1052	52
N.	Provincial Public Health Laboratory, Rupandehi	1476	317
O.	Bheri Hospital, Nepalgunj, Banke	1792	104
P.	Rapti Academy of Health Science, Dang	690	
Q.	Surkhet Provincial Hospital/ Avian Disease Investigation Laboratory, Surkhet ★	1775	371
R.	Karnali Academy of Health Science, Jumla	1378	
S.	Seti Provincial Hospital / Avian Disease Investigation Laboratory, Dhangadi ★	1586	161
	Total	**35494**	**2488**

★indicate four veterinary laboratories used in the COVID-19 RT-PCR diagnosis (Situation Report, Ministry of Health and Population (MoHP), May 20, 2020). In Nepal's COVID-19 situation is on a rise with 3,762 confirmed cases, 488 recovery and 14 deaths, during which 100,971 had undergone PCR and 156,991 RDT (June 8, 2020). Source: Situation Report, MoHP (https://covid19.mohp.gov.np/#/).

2. Materials and Methods

Review of existing papers and information was used to prepare this opinion paper. Official letters are used to explain the situation and pictures obtained from popular social media to elaborate the idea. Information in media, social discussion forums, website of institutions was also used as materials to come to the opinion.

3. Discussion

Humanity finds itself in a difficult situation partly because of its own miscalculations. Now from frying pan to fire, lockdown and social distancing to be safe versus venturing out for livelihood, it is a tricky position to be. The impact of this pandemic will be multi-dimensional, multi sectoral and for unknown period of time. The immune system of an individual and society as a whole will decide how we fare with the exposure which is inevitable. National immunity in terms of its own resiliency and capacity to mobilize its own resources for self-sustenance will decide how we face the enemy within and outside. As an old saying goes, troubles come in gang, we are seeing some signs of it in form of sovereignty breach, brewing discontentment, looming uncertainty in general population to many others. Declining revenues warrant that we spend our pennies in right place and generate more to survive the turmoil clouding the future of all the nations in the planet. Patriotism is warranted even more now, realising our strength and focusing on the right track for tomorrow's bright future is our wisdom. Collective social transformation will help us achieve the goals. Natural resources are bountiful in Nepal but we cannot abuse them for we have to ensure that sustainable caressing is done. One Health approach is the envisioned way for achieving it. The core to the approach is Veterinary medicine and it has to be given due regard in terms of policy formulation and application. We in university have to ensure that we do not just impart theoretical knowledge and promote brain drain but instill confidence in entrepreneurship and self-employment of the graduates. Through sustainable medicine, ethical, healthy treatment is ensured and produces fetch prime value. Application of available local resources in the raising and treatment systems will ensure the reduction in margin of trade deficit. The upgrading of facilities in universities and government as well as private organisations can be modified to serve the greater cause of prevention, diagnosis of many zoonotic diseases that comes with heavy economic burden.

4. Conclusions

This opinion piece concludes with a wish that TU take the initiative in realising the Government of Nepal's focus, investment and policies in agriculture and veterinary science among others. Its experienced faculty members are crucial in the success to transfer experience based knowledge to the fresh graduates and postgraduates and initiating brain gain. This will be crucial in the post COVID-19 recovery and rebuilding phase. Self-sufficiency in all spheres, most important the food security and safety should be our focus as we spend our limited foreign currency wisely and unloosen the shackles on foreign dependency that is constricting our everyday life including our sovereign border. This is only possible by having visionary person in the leadership role, reducing and removing barriers of unnecessary red tape culture and cordial learning atmosphere. Brain gain and their dignified engagement should be the national policy. Stress on veterinary science to lead the One Health initiative and formulating policies around it should be the

advice to all three tiers of governance (local, provincial and federal) in contemporary Nepal.

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