Trade of Livestock Products and FMD as an Obstacle to Enhance Trade

MARCH 2021

ISBN: 978-969-7517-33-6

UVAS
UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES LAHORE

UVAS
BUSINESS SCHOOL

Center for Applied
Policy Research in Livestock (CAPRIL)
University of Veterinary &
Animal Sciences, Lahore

EDITORIAL TEAM

Prof. Dr. Rana Muhammad Ayyub
(Director, CAPRIL, UVAS, Lahore, Pakistan)

Dr. Muhammad Imran
(Assistant Professor, DEBM, UVAS, Lahore, Pakistan)

Dr. Muhammad Ijaz
(Associate Prof. Dept. of Vet. Medicine, UVAS, Lahore, Pakistan)

Prof. Dr. Muhammad Hassan Mushtaq
(Dept. of EPPH, UVAS, Lahore, Pakistan)

TO CITE THIS:

Ayyub , R.M., Imran M., Ijaz M and Mushtaq M.H. (2021), "Trade of Livestock products and FMD as an obstacle to enhance trade". A policy paper written under Center for Applied Policy Research in Livestock (CAPRIL) at UVAS, Lahore.

Vice Chancellor Message

It is due honor for me to introduce the University of Veterinary and Animal Sciences (UVAS), Lahore, which has been ranked among the top ten universities as per Higher Education Commission (HEC) Pakistan 2020 ranking. This university is known for it`s involvement in quality teaching, training, clinical services, research activities, civic engagements, policy formulation and close working with all the stake holders of the Livestock sector.

The livestock sector has the largest share in the economy, contributing about 58.6% to the agriculture value added and about 11.4% to the national GDP. The share of livestock products in the generation of foreign exchange is about 13% which is quite meager as compared to its potential being on 4th rank in total livestock population of the world. This is due to the reasons that this sector has been facing many problems. Foot and Mouth Disease (FMD) is one of the most important prevalent disease, which is considered the main obstacle in trade of Livestock and related products.

The Center for Applied Policy Research in Livestock (CAPRIL) of UVAS has been involved in highlighting the policy initiatives for the Livestock sector in the form of organizing various evidence-based policy research activities. This center has produced many policy papers, policy briefs, and research reports. I appreciate the efforts of editorial team for producing this policy paper on a very important aspect of FMD and its impact on trade of Livestock and related products from Pakistan. I expect that this paper will help our policy makers to devise prudent policies in this regard.

Prof. Dr. Nasim Ahmad *(S.I.)*

Livestock Sector and Major Production & Consumption Commodities

Over the years Livestock has emerged as an important subsector of the agriculture sector. Its contribution to the overall value-added and agriculture sector has substantially increased. Livestock is a source of protein as well as contributes significantly to exports earnings. The main exported and consumed commodities of livestock are meat, milk, and hides & skins. Pakistan produced 4.70 million tonnes of meat in the financial year 2019-20. Pakistan has 49.6 million cattle, 41.2 million buffalo, 78.2 million goats, and 31.2 million sheep population (GOP, 2020)[1]. This big population of different species provides a significant quantity of main products such as meat and milk, by-products. Hides and skins are another product provided by livestock animals. Pakistan produced 18.14 million tonnes of hides, 58.11 million tonnes of skins, and 61.69 million tonnes of milk in FY 2019-20 (GOP, 2020). The trade deficit has been a consistent problem for the economy of Pakistan. Historically, Pakistan has been exploring new avenues to increase its exports to restrict the ever-growing trade deficit. Livestock products have a significant potential to increase Pakistan's export volume (Ayyub et al. 2018)[2].

However, the livestock sector is facing a low productivity issue among the major issues responsible for low production and enormous financial losses to the livestock sector, Foot and Mouth Disease (FMD) is on the top of list. It has been regarded most common infectious disease of livestock in Pakistan, by Pakistan Agricultural Research Council (PARC)[3]. Considering the loss of milk production, infertility, incapacitation of draught animals, high morbidity, list of meat products, and young stock mortality, the losses of FMD are enormous (Sanaullah et al. 2019)[4]. Pakistan's presence in FMD affected countries has many economic consequences. Therefore, appropriate measures are needed to eradicate this disease from the country. Food and Agriculture Organization (FAO) has declared FMD as one of the three major diseases apart from Avian Influenza (AI) and Bovine Spongiform Encephalopathy (BSE) which have been a major cause of instability in meat markets and trade (FAO 2006)[5]. Keeping in view the devastating effects of FMD on national economy, it is mandatory to adopt "The Progressive Control Pathway for Foot and Mouth Disease (PCP-FMD)" developed by FAO and OIE to reduce the impact of FMD and to lessen the virus load in the country.

[1]Economic Survey of Pakistan 2019-20, Ministry of Finance, Govt. of Pakistan
[2]Ayyub RM, Tahir AT, Ali E. 2018. Market Analysis report regarding Malaysia. Livestock and Poultry Export Guide. Export facilitation Center of Livestock and poultry (EFCLP), University of Veterinary and Animal Sciences, Lahore
[3]Pakistan Agricultural Research Council. http://www.parc.gov.pk/index.php/en/faqy/131-narc/animal-sciences-institute/614-animal-health
[4]Sanaullah et al. 2019. Emergence, existence and distribution of foot and mouth disease in Pakistan in comparison with the global perspective. GSC Biological and Pharmaceutical Sciences, 2019, 07(01), 102–110
[5]FAO. 2006. Use of Fishery Resources as Feed Inputs To Aquaculture Development: Trends And Policy Implications. Available at: https://epub.sub.uni-hamburg.de/epub/volltexte/2008/639/pdf/C1018.pdf

Status of Foot and Mouth Disease (FMD) in Pakistan

FMD is very important infectious disease of animals, and it is the main hurdle in animal and animal by product trade (Abubakar et al. 2009)[6]. It mainly effects the cloven-footed animals e.g., cattle, Buffalo, sheep, and goats. FMD is a viral disease, and it is caused by the Aphthovirus belonging to family Picornaviridae (Nawaz et al. 2014)[7]. These viruses are single stranded RNA and non-enveloped. It has an icosahedral capsid. Capsid is made up of 60 protomers which are packed in icosahedral symmetry. FMD virus has seven serotypes e.g., O, A, C, Asia-1, SAT-1, SAT-2, and SAT-3. Serotype O is most prevalent in Pakistan which is 70% followed by ASIA-I which is 25% and A which is only 4.67%. These serotypes cause a great loss to farmers. It may reach up to 6.00 billion per year in Pakistan (Zulfiqar 2003)[8]. In Pakistan, Foot and mouth disease is present in endemic form in various areas and is causing great economic loss in large ruminants e.g., water buffalo and cattle and outbreaks are reported on yearly basis (OIE 2007)[9]. In cattle morbidity rates are 53.2 % and 15.3% mortality rates. In buffaloes, Morbidity rate is 61.7 % and mortality rates is 20.8 %. This disease is more severe and highly prevalent in animals in Pakistan because exotic breeds are imported, and local breeds are cross breed. Few years back, FMD was a seasonal disease, but now this disease remains prevalent throughout the year in chronic and acute form (Waheed et al. 2011)[10]. FMD is the most prevalent and economically the deadliest infectious disease of cattle and buffaloes in Pakistan. Annual losses are estimated to exceed USD 692 million in terms of loss of milk production, treatment cost, body weight loss and mortality in calves. FAO has been working for the control of FMD in Pakistan since 2008. On a FAO-OIE FMD Progressive Control Pathway, Pakistan moved from stage 0 to stage 1 in 2009 and to stage 2 in 2015. FAO project will move Pakistan to stage 3 and thus opening up further international markets for the export of meat and other livestock products. Pakistan in 2018 has launched National FMD Control Program titled “Risk Based Control of Foot and Mouth Disease in Pakistan 2018-2024” at a cost of $6.598 million. The project has combined people and resources from provincial/regional and federal veterinary services with those of FAO, USDA and several other organizations into a network with the clear objective of the progressive control of Foot and Mouth Disease in Pakistan.

Cambodia, Philippine, Thailand and Vietnam are the endemic countries of FMD. Brunei, Indonesia, Singapore, and Malaysia are free from FMD recognized by the OIE without vaccination. There is a link between the strains of virus of Pakistan, Afghanistan, Iran, Turkey and Saudi Arabia (Rweyemamu et al. 2008)[11].

[6]Abubakar M, Ferrari G, Hussain M, Haq E, Arshed M, Ali Q. 2009. Prevalence of foot-and-mouth disease virus serotypes in Pakistan. Pak J Zool. Suppl. 9: 351-355.
[7]Nawaz Z, Arshad M, Iqbal Z. 2014. Epidemiology of foot and mouth disease in buffaloes and cattle of Punjab using non structural proteins ELISA. Pakistan J Agric Sci. 51(2).
[8]Zulfiqar M. 2003. Draft report for development of National disease control policy for foot and mouth disease in Pakistan under the FAO project “Support for emergency Prev control of main Trans animal Dis in Pak RP. FMD, PPR. 90
[9]Anonymous 2006 World Reference laboratory for Foot-and-Mouth Disease. Annual OIE/FAO FMD reference laboratory network report (January-December), Institute of Animal Health, Pirbright, UK, pp 17-22.
[10]Waheed U, Parida S, Khan Q, Hussain M, Ebert K, Wadsworth J, Reid S, Hutchings G, Mahapatra M, King D. 2011. Molecular characterisation of foot-and-mouth disease viruses from Pakistan, 2005–2008. Trans Emer Dis. 58(2): 166-172.
[11]Rweyemamu M, Roeder P, Mackay D, Sumption K, Brownlie J, Leforban Y, Valarcher JF, Knowles N, Saraiva V. 2008. Epidemiological patterns of foot-and-mouth disease worldwide. Trans Emer Dis. 55(1): 57-72

Main Imported and exported Livestock Commodities

A. Main Export Commodities (Information is given in Annexure I)

- Pakistan Exported livestock products worth 533.90 million USD in the financial year 2019-20.
- Major exports of the livestock sector are meat and related products, Hides and skins, and leather.
- Exports of meat-related products were 267 million USD in FY 2019-20. Which is almost 50% of total exports from livestock.
- Export of skin, hides, and leather was 200 million USD and its share in total livestock exports is 37.50%.
- Another category which contributes almost 10.30% in total livestock exports is of by-products (detail given in annexure). Pakistan exported livestock by-products worth 55 million USD in FY 2019-2020.

Table 1. Production of Main Livestock commodities in Pakistan

Commodity (000 Tonnes)	**2018-19**	**2019-20**
Meat	**4,478**	**4,708**
Beef	2,227	2,303
Mutton	732	748
Hides	17,547	18,139
Skins	56,805	58,116
Milk	59,759	61,690

Source: Economic Survey of Pakistan, 2019-2020[12] .

a) Trading Partners

- The majority of the meat and related products are exported to Gulf countries. Vietnam has been used as an indirect trade route for Pakistani meat to reach China.
- The leather of Animals is mainly exported to Italy, China, Bangladesh, Vietnam, and Hong Kong.
- Vietnam, South Korea, China, and Italy are the main destinations for the export of leather prepared after tanning.

Table 2: Major Export destination Countries

Commodity	Major trade Partner Countries
Meat and Related Products	U.A.E., Saudi Arabia, Bahrain, Qatar, Oma, Kuwait, Malaysia, Vietnam
Hides, Skins, and leather	Vietnam, Italy, Hong Kong, China, Bangladesh, South Korea
By-products	China, Japan, Hong Kong, Vietnam, Spain, Romania.

Source: State Bank of Pakistan [13].

[12]Economic Survey of Pakistan, 2019-202. http://www.finance.gov.pk/survey/chapter_20/02_Agriculture.pdf
[13]State Bank of Pakistan. External Trade Data, https://www.sbp.org.pk/departments/stats/Annual_Export_Receipt/indexArc.htm

B. Main Import Commodities (Information is given in Annexure-II)

- Pakistan imported livestock products worth 233 million USD in FY 2018-19
- The main import includes milk and cream, whey and milk products, Raw skins of sheep lambs, cheese and curd, and meat and related products (not halal).
- Import of milk and related products valued at 128 million USD in FY 2018-19 which is 56% of total imports in this category.
- Hides and skins are the second largest commodity category imported. In 2018-19, Pakistan's import bill of hides and skins was 41 million USD.
- Live animals worth 23 million USD were also imported in 2018-19.
- Other imported commodities include meat and related products (not halal), live horses, asses, mules, and hinnies, fats of bovine animals (volume of export is given in annexure).

a. Trade Partners

- Milk and cream are mainly imported from the USA, New Zealand, France, and the Netherlands.
- Whey and milk products are imported from France, Poland, and Turkey.
- New Zealand, UAE, and Turkey are major trade partners for imports of Cheese and Curd.
- Raw skins of sheep and lamb are imported from Switzerland, New Zealand, and South Africa.
- Sheep or lambskin leather is mainly imported from Saudi Arabia and UAE.
- Singapore and China are the major trade partners for the import of Live horses and assess.
- Live Bovine animals are mainly imported from Australia.

Table 3: Trade Partners for Import of livestock Products

Commodity	Major trade partners countries
Milk and related products	USA, France, New Zealand, Netherlands
Hides, Skins, and leather	Switzerland, New Zealand, Saudi Arabia, UAE
Live Animals	Australia, USA, Singapore
By-products	India

Source: State Bank of Pakistan[13].

Pakistan is currently exporting a wide range of livestock products. Few commodities are being exported without any problem generated due to FMD. Pakistan is exporting leather products to many countries and these products contribute significantly to total export. However, few products like meat, live animal, etc. are subject to certification. The prevalence of FMD throughout the country is creating many hindrances to boost export and explore new markets. One such example is trade with China, despite historic trade and bilateral relations Pakistan cannot export meat products to China. And much of the export to China is being carried indirectly through Vietnam (Ayyub et al. 2018)[14].

[13]State Bank of Pakistan: https://www.sbp.org.pk/departments/stats/Annual_Export_Receipt/indexArc.htm

[14]Ayyub RM, Tahir AT, Ali E. 2018. Market Analysis report regarding China. Livestock and Poultry Export Guide.Export facilitation Center of Livestock and poultry (EFCLP), University of Veterinary and Animal Sciences, Lahore.

Livestock Trade's Role in the Overall Economy

The livestock sector has a significant contribution to the economy of Pakistan. It is the largest subsector of the agriculture sector. Its contributions range from the source of protein, income for poor families, to export earnings. Livestock contributes 3.1% in total exports of Pakistan (GOP, 2020)[1]. Categories discussed above contribute almost 2.05% in total exports of Pakistan. On the other hand, though livestock products import does not have a major share in total imports of Pakistan. However, for a country blessed with rich livestock resources reliance on imports is unfortunate. In FY 2018-2019, imports of the above-mentioned products were 0.37% of the total imports of Pakistan. The nature has abundantly gifted the Pakistan with variety of livestock resources (Ayyub et al. 2018).[14] Keeping in view the geographic location of the country and livestock resources it can be said that Pakistan can boost its export volume if proper measures are taken to solve problems existing in the Livestock sector. Eradication of FMD is one such area that needs proper attention and action.

Relevant Trade Agreements

Pakistan and China have signed the 2nd China Pakistan Free Trade Agreement (CPFTA-II) in 2019. In CPFTA-II, China agreed to eliminate the tariff on 313 major export items (MOC, 2019)[15]. Concessions are given on the trade of many agriculture products, especially Livestock products.

FMD Transmission and Its Significance for Trade

Among susceptible species, there may be differences in severity of infection based on the amount of virus at inoculation, the serotype involved, the species affected, and the individual animal's immunity. There is a wide range of clinical symptoms ranging from subclinical, unapparent infection as is seen typically in African buffalo to acutely fatal infection with extensive pathology to the pancreas, as occurs in mountain gazelles. The virus is epitheliotrophic, and typical lesions are vesicles that rupture and leave erosions or ulcerations and result in lameness or difficulty eating. Lesions often occur in the oral cavity (tongue, dental pad) and coronary bands in bovids and interdigital locations in suids and cervids.

Infection occurs generally through aerosolization of virus. Although transmission from abrasions of mucus membranes can occur, this requires 10,000 times more virus to cause an infection. Aerosol spread is frequently implicated in wildlife, but the exact transmission is uncertain as it is difficult to determine the contribution of other potential methods of transmission (e.g., fomites or waterborne. Virus has been isolated in milk, semen, urine, and feces. Replication occurs rapidly, and many species infected experimentally demonstrate virus in the respiratory tract 24 hr after infection and in epithelial cells of lesions after 72 hr. Incubation is 2–14 days depending on the infective dose and route of transmission. In domestic swine, infection usually occurs after being fed FMD-contaminated swill or direct contact with FMD-infected animals or fomites. Swine are less susceptible to spread via aerosols than cattle; however, they excrete the largest amount of aerosolized virus.

Transmission route of disease and the origin of virus can be traced through phylogenetic analysis using full or partial genome. Seven serotypes of FMD virus A, O, Asia-1, C, SAT1,2, 3 do not cause cross reaction against each other after vaccination or infection. SAT-1, SAT-2, SAT-3 is usually prevalent in sub-Saharan Africa. And Asia-1 is prevalent in Asia.

[15]MOC. Ministry of Commerce, Govt. of Pakistan. http://www.commerce.gov.pk/protocol-on-phase-ii-china-pakistan-fta/

In an outbreak of Ethiopia in 2005, serotype C was reported. Sometime effective cross protection is failed to occur within the same serotype against the viruses by the subtypes of the serotypes. It is very difficult to control a disease due to new strain emergence. Foot-and-mouth disease (FMD) is an infectious disease that affects up to 70 species of cloven-hoofed mammals including cattle, sheep, goats, and pigs (Jamal et al. 2011) [16]. FMD virus is mainly transmitted through aerosol route. This virus can travel to a long distance. It can also transmit by direct contact of healthy animals with the infected animals but can also be shed in semen, food products and by fomites. FMDV is also shed in feces of infected pigs for up to 10 days. This virus can survive in feces for 103 days and in manure for 70 days in cattle at 17 degrees centigrade (Amass et al. 2003)[17]. Fever, dull, depression, vesicles on feet, mouth and teats are appeared and lameness develops. Some animals may become carrier of FMDV and shed this virus in oral and nasal fluid (Alexandersen et al. 2002)[18]. As foot and mouth disease is most contagious disease for animals. So, for its effective control very quick diagnostic tools which are highly specific and sensitive should be used. FMD is diagnosed by Virus isolation, Sandwich-ELISA, Indirect ELISA, Multiplex PCR and Real time PCR now days. Nucleotide sequencing are also used for serotyping (Longjam et al. 2011)[19] . After the eradication of Rinderpest, FAO and OIE collaborated with each other to control the FMD. A progressive control strategy is being adopted by FAO to control FMD (Brückner and Saraiva-Vieira 2010)[20]. The clinical presentation of FMD in wildlife has been reviewed. In general, the symptoms in wildlife are similar to those in domestic animals, although the pathogenesis of FMD virus (FMDV) in many susceptible wildlife species has not been studied extensively. There is clear variation in the susceptibility to FMDV based on the host species and viral serotype involved.

Important Challenges

Though Pakistan is exporting livestock products to many countries in the world, however, the existing potential of trade is not fully harnessed, and Pakistan's chilled meat exports are currently limited to Gulf countries and frozen meat is limited to Malaysia and Vietnam. FMD is a hindrance to trade many countries, especially our neighboring China. China's meat market volume is around 15 billion USD. Moreover, the Halal food market is a big attraction for Pakistan and can capture a big portion of the Muslim world (around 50 Muslim-majority countries.

Due to non-certification, Pakistan can't compete with major exporters like New Zealand and Australia in the middle east as well as elsewhere. China's meat market volume is around 15 billion USD. Due to the ban on the import of meat from FMD susceptible products Pakistan cannot benefit from this huge potential despite different trade agreements. In order to penetrate into other markets like China, Indonesia and Russia, Pakistan must comply with the OIE regulations

[16]Jamal SM, Ferrari G, Ahmed S, Normann P, Belsham GJ. 2011b. Molecular characterization of serotype Asia-1 foot-and-mouth disease viruses in Pakistan and Afghanistan; emergence of a new genetic Group and evidence for a novel recombinant virus. Infect Genet Evol. 11(8): 2049-2062

[17]Amass et al. 2003. Procedures for preventing the transmission of foot-and-mouth disease virus to pigs and sheep by personnel in contact with infected pigs. Veterinary Record, 153, 137-140

[18]Alexandersen et al. 2002. Detection of all seven serotypes of foot-and-mouth disease virus by real-time, fluorogenic reverse transcription polymerase chain reaction assay. Journal of Virological Methods.105(1): 67-80

[19]Longjam N, Deb R, Sarmah A, Tayo T, Awachat V, Saxena V. 2011. A brief review on diagnosis of foot-and-mouth disease of livestock: conventional to molecular tools. Vet Med Int. 2011.

[20]Brückner G, Saraiva-Vieira V. 2010. OIE strategy for the control and eradication of foot and mouth disease at regional and global levels. Compendium of technical items presented to the OIE World Assembly of Delegates and to OIE Regional Commissions. 187-211

regarding FMD free zones/compartments. Once these zones/compartments are notified and accepted by OIE, Pakistan would be allowed to export meat to a number of countries including those mentioned above. Pakistan is currently at Stage-II incursion of the FMD virus as defined by the OIE PCP-FMD. It is mandatory for Pakistan to establish FMD free zones/compartments in line with the OIE guidelines to progress to the next Stage of FMD PCP i.e., Stage-III that will allow export of meat from these areas.

Establishing and maintaining a disease-free status throughout the country should be the final goal for OIE Members. However, given the difficulty of establishing and maintaining a disease-free status for an entire territory, especially for diseases the entry of which is difficult to control through measures at national boundaries, there may be benefits to a member in establishing and maintaining a sub-population with a distinct health status within its territory. Sub-populations may be separated by natural or artificial geographical barriers or, in certain situations, by the application of appropriate management practices. To meet China's demand of importing meat from Pakistan following interventions includes veterinary management systems in this intervention Laws and regulations should be regulated, veterinary institution, laboratory system should be made. Other intervention includes boundary setting, in this intervention geographical artificial barriers should be made. Other Intervention includes regional management measures and to meet this demand identification traceability, movement control, monitoring, investigation, report & disposal of the epidemic situation immunization are needed. Livestock & Dairy Development Department & private sector should run vaccination campaign, lab surveillance should be regulated and monitored with strict biosecurity measures to enhance foreign investment and meet the emerging needs to build up economy of country.

Risk Management Measures

FMD which has hampered the export of livestock products from Pakistan has caused significant losses to the economy of Pakistan. Recently Pakistan has signed an agreement with China to establish an FMD free zone in Pakistan. China will help technically and financially in the establishment of FMD zones. This agreement is said to be a milestone in China Pakistan Economic Corridor, this agreement will increase Pakistan's Competency in the export of livestock products.

Given the difficulty of establishing and maintaining a disease-free status throughout the country, there may be benefits to a Country in establishing and maintaining a subpopulation with a specific health status within its territory for the purposes of international trade or disease prevention or control. Subpopulations may be separated by natural or artificial geographical barriers or by the application of appropriate biosecurity management. Zoning is a process in which a country divides its territory into geographical regions according to different animal health status in order to promote international trade according to the requirements of relevant chapters of the Terrestrial Animal Health Code Compartmentalisation is a procedure implemented by a Member Country, making it possible to pursue

trade from an animal disease free subpopulation of animals within a country or zone not free of the disease. Under the terms of the OIE Terrestrial Code, a compartment 'means an animal subpopulation contained in one or more establishments under a common biosecurity management system with a distinct health status with respect to a specific disease or specific diseases for which required surveillance, control and biosecurity measures have been applied for international trade. All compartments need to be approved and audited by the national veterinary authorities. Principles for defining and establishing a zone or compartment, including protection and containment zones. Zoning and compartmentalization are a procedure for identifying subpopulations of health status according to OIE provisions, for the purposes of international trade or disease prevention or control. Zoning applies to an animal subpopulation defined primarily on a geographical basis. Compartmentalisation applies to an animal subpopulation defined primarily by management and husbandry practices related to biosecurity. In zoning regionalization is carried on geographical basis while compartmentalization is based on Functional unit of zoning or its combination. Zoning is operated by government while compartments are governed by official guidance. Purpose of zoning includes to eliminate the epidemic while objective of compartments includes Protect and promote animal trade. Zoning is confirmed by domestic officials while compartmentalization is confirmed by domestic official and international recognition. In conjunction with the above considerations, the following principles will be applied as three dairy and three fattening farms will be identified as compartments of disease-free level. There are different proposals to establish farms as free compartments. Establishment of Check Posts at farm entrances. One farm may be declared as Quarantine area with equipped labs.3 – 5 km of Buffer Zone around all the farms. Control of movements of relevant commodities & traceability. Record maintenance of production, feed, water and bedding sources, birth and death records, medications, vaccinations, treatment records. Documentation of training of relevant personnel and any other criteria necessary for evaluation of risk management. Livestock & Dairy Development Department & private sector should run vaccination campaign, lab surveillance should be regulated and monitored with strict biosecurity measures to enhance foreign investment and meet the emerging needs to build up economy of country. There are different alternate methods available if zoning or compartmentalization is not furnished and trade of meat products or live animals is hindered. These alternate methods include, trade of meat using mild heat treatment either semi cooked meat on steam or heat. Other important alternate method includes FFP (Further Food Processing) in which meat products are value added by forming meat snacks. These different methods increase value addition and cover the hindrance in live animal trading or by-products trading.

Annexure I: Exports

Table 4. Category-wise export of livestock products in 2019 & 2020

Year/category (Amount in Million USD)	Meat and Related Products (A)	Hides, Skin and (B)	By products (C)	Milk and related Products (D)	Live Animals (E)	Total (A+B+C+D+E)
2018-19 (%age Share in total livestock exports)	221 (42)	220 (41.78)	57.28 (10.88)	25 (4.74)	3.17 (0.6)	**526.45 (100)**
2019-20) (%age Share in total livestock exports)	267 (50)	200 (37.50)	55 (10.30)	8 (1.48)	3.90 0.72	**533.9 (100)**

Source: Authors' calculation based on data from State bank of Pakistan.

Table 5. Export data of commodities included in hides, skins and leather category

Commodity (Amount in million USD)	2018-19	2019-20	Major trade partners and their share in total export	
Raw Hides and Skins of Bovine or Equine Animals	0	0.03	USA	44%
Raw Skins of Sheep or Lambs NES	0	0.01	Romanian	29%
			Italy	23%
Raw Hides and Skins NES	0.06	0.10	Italy	29%
			China	27%
Bovine or Equine Leather, No Hair NES	9.36	6.28	Indonesia	34%
			Cambodia Kampuchea	19%
			Hong Kong	10%
Sheep or Lamb Skin Leather, No Wool NES	1.62	0.71	Bangladesh	34%
			Turkey	20%

			Japan	17%
Goat or Kidskin Leather, No Hair NES	1.02	0.47	Japan	71%
Leather of Animals NES, No Hair NES	125.61	82.51	Italy	18%
			China	14%
			Bangladesh	9%
			Hong Kong	8%
			Vietnam	7%
Leather further prepared after tanning (sheep, lamb)	17.31	17.56	China	12%
			South Korea	11%
			Bangladesh	10%
			Spain	9%
Leather further prepared after tanning (other animal)	64.48	91.56	Vietnam	14%
			China	12%
			Italy	10%
			South Korea	10%
Total	220	200		
Major trading partners for export of hides, skins and leather	Vietnam, Italy, Hong Kong, China, Bangladesh, South Korea			

Source: Authors' calculation based on data from State bank of Pakistan

Table 6. Export data of commodities included in meat and related products category

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trade partners and their share in total export**	
Meat of Bovine Animals, Fresh or Chilled	177.92	221.90	U.A.E. Abu Dhabi	33%
			Saudi Arabia	17%
			Bahrain	15%
			Afghanistan	13%
			Kuwait	6%
Meat of Bovine Animals, Frozen	21.11	16.64	U.A.E. Abu Dhabi	39%
			Vietnam	19%
			Malaysia	9%
			U.A.E. Sharjah	6%
Meat of Sheep or Goats, Fresh, Chilled or Frozen	21.91	27.48	Saudi Arabia	50%
			U. A. E. Dubai	19%
			Qatar	11%
			Oman	6%
Total	221	267		
Major trading partners for export of meat and related Products	U.A.E., Saudi Arabia, Bahrain, Qatar, Oman, Kuwait, Malaysia, Vietnam.			

Source: Authors' calculation based on data from State bank of Pakistan

Table 7. Export data of commodities included in live animals category

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trade partners and their share in total export**	
Live Bovine Animals	0.04	0.16	Hong Kong	69%
			Oman	31%
Live Sheep and Goats	0.04	0.01	Egypt	100%
Live Horses, Asses, Mules and Hinnies	2.21	0.83	Timor	16%
			China	15%
			USA	14%
Live Animals NES	0.92	0.89	Oman	48%
			Bahrain	10%
			Uzbekistan	10%
			Qatar	9%
			Turkey	7%
Total	3.17	3.90		
Major trading partners for export of Live Animals	Hong Kong, Oman, Timor, China, USA, Qatar			

Source: Authors' calculation based on data from State bank of Pakistan

Table 8. Export data of commodities included in milk and related products category

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trade partners and their share in total export**	
Butter and other Fats and Oils Derived from Milk,	0.03	0.133	USA	38%
			Hong Kong	33%
Milk and Cream, Not Concentrated or Sweetened	14.85	3.72	Afghanistan	97%
Milk and Cream, Concentrated or Sweetened	3.72	3.25	Afghanistan	78%
Butter milk, Yogurt, Kephir etc., Flavored Not	6.376	0.63	Switzerland	60%
			Tajikistan	38%
Whey and Milk Products NES, Flavored etc. or	0.023	0.25	Afghanistan	100%
Total	25	8		
Major trading partners for export of milk and related products	Afghanistan			

Source: Authors' calculation based on data from State bank of Pakistan

Table 9. Export data of commodities included in by-products category

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trade partners and their share in total export**	
Bones & Horn - Cores, Unworked, Defatted, Simply	9.84	13.24	China	61%
			Japan	30%
Ivory, Tortoise-Shell, Whalebone etc.	1.63	0.71	Germany	80%
Coral, Shell of Molluscs etc. unworked or Simply	0.28	0.08	China	73%
Ambergris, Castoreum, Civet and Musk	0.22	0.23	Brazil	40%
			Japan	39%
Animal Products NES, Inedible Dead Animals	0.09	0.002	-	-
Edible Offal of Bovine Animals; Swine, Sheep	11.11	7.44	Hong Kong	16%
			Viet Nam	54%
			China	8%
Other Meat & Edible Offal ; Fresh, Chilled or	0.23	0.30	Saudi Arabia	93%
Edible Products of Animal Origin, NES	0.05	0	-	-
Guts, Bladders, Stomachs of Animals (Not Fish)	20.052	17.31	Vietnam	17%
			Spain	16%
			Romania	15%
			Poland	12%
Fats of Bovine Animals	13.78	15.32	-	-
Total	57.28	55		
Major trading partners for export of by-products	China, Japan, Hong Kong, Vietnam, Spain, Romania.			

Source: Authors' calculation based on data from State bank of Pakistan

Annexure II: Imports

Table 10. Category-wise import of livestock products in 2019 & 2020

Year/category (Amount in Million USD)	Meat and Related Products (A)	Hides, Skin and leather (B)	Byproducts (C)	Milk and related Products (D)	Live Animals (E)	Total (A+B+C+D+E)
2018-19 (%age Share in total livestock exports)	19.49 (8.36)	41 (17.59)	21.53 (9.25)	128 (54.93)	23 (9.87)	**233 (100)**
2019-20 (%age Share in total livestock exports)	2.33 (1.7)	29 (22.03)	4.26 (3.23)	86 (65.35)	10 (7.69)	**131.59 (100)**

Source: Authors calculation based on data from State bank of Pakistan

Table 11. Import data of commodities included in Hides, Skins, and Leather category (Million USD)

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trading partners and their share in imports**	
Raw Hides and Skins of Bovine or Equine Animals	1.49	0.62	China	31%
Raw Skins of Sheep or Lambs NES	16.29	9.66	Switzerland	16%
			New Zealand	14%
			South Africa	8%
Raw Hides and Skins NES	4.67	2.82	Saudi Arabia	37%
			UAE Dubai	31%
Bovine or Equine Leather, No Hair NES	1.15	1.35	Italy	73%
Sheep or Lamb Skin Leather, No Wool NES	7.41	7.70	Saudi Arabia	35%
			UAE Dubai	16%
Goat or Kidskin Leather, No Hair NES	2.95	2.35	Kenya	26%
			UAE Dubai	26%
Leather of Animals NES, No Hair NES	4.99	2.24	Thailand	17%
			Turkey	14%

			China	32%
Leather further prepared after tanning (sheep, lamb)	0.84	1.12	Turkey	96%
Leather further prepared after tanning (other animal)	0.49	0.31	Australia	43%
Total	41	29		
Major trading Partners for imports of Hides, Skins, and leather	Switzerland, New Zealand, Saudi Arabia, UAE			

Source: Authors' calculation based on data from State bank of Pakistan

Table 12. Import data of commodities included in Milk and related products category

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trading partners and their share in imports**	
Butter and other Fats and Oils Derived from Milk,	1.11	0.66	-	-
Milk and Cream, Not Concentrated or Sweetened	1.25	0.18	UAE Dubai	35%
			Saudi Arabia	28%
Milk and Cream, Concentrated or Sweetened	95.35	57.79	USA	23%
			New Zealand	18%
			France	13%
			Netherland	5%
Butter milk, Yogurt, Kephir etc. Flavored Not	0.1	0.02	Australia	87%
Whey and Milk Products NES, Flavored etc. or	20.91	21.10	France	35%
			Poland	17%
			Turkey	24%
Cheese and Curd	9.05	5.92	New Zealand	26%
			Turkey	14%
			UAE Dubai	13%
Total	128	86		
Major trade partners for import of milk and related products	USA, New Zealand, France, Netherlands			

Source: Authors' calculation based on data from State bank of Pakistan

Table 13. Import data of commodities included in Meat and related products category

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trading partners and their share in imports**	
Meat and related products (not halal)	17.10	2.23	China	-
Meat of Bovine Animals, Fresh or Chilled	1.53	0.002	UAE Dubai	10%
Meat of Bovine Animals, Frozen	0.81	0.091	UAE Dubai	89%
Meat of Sheep or Goats, Fresh, Chilled or Frozen	0.05	0.008	New Zealand	100%
Total	19.49	2.33		
Major Trading partner for import of meat and related products	China, UAE			

Source: Authors' calculation based on data from State bank of Pakistan

Table 14. Import data of commodities included in Live animals' category (Million USD)

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trading partners and their share in imports**	
Live Bovine Animals	5.54	7.25	Australia	66%
			USA	17%
			Netherlands	7%
Live Sheep and Goats	0.05	0	-	-
Live Horses, Asses, Mules and Hinnies	17.10	2.23	China	26%
			Singapore	47%
Live Animals NES	0.10	0.07	Belgium	84%
Total	23	10		
Major trading partners for import of live animals	Australia, USA, Singapore			

Source: Authors calculation based on data from State bank of Pakistan

Table 15. Import data of commodities included in by-products category

Commodity (Amount in Million USD)	**2018-19**	**2019-20**	**Major trading partners and their share in imports**	
Crustaceans; Live, Fresh etc, and Cooked etc.	0.04	0.04	-	-
Bones & Horn - Cores, Unworked, Defatted, Simply	1.12	0.64	India	73%
Ivory, Tortoise-Shell, Whalebone etc	0.006	0	Poland	100%
Coral, Shell of Molluscs etc. unworked or Simply	0.004	0.006	Tanzania	100%
Ambergris, Castoreum, Civet and Musk	0	0.001	USA	67%
Animal Products NES, Inedible Dead Animals	1.70	1.22	-	-
Edible Offal of Bovine Animals; Swine, Sheep	6.42	0.74	India	78%
Other Meat & Edible Offal ; Fresh, Chilled or	0	0.001	-	-
Edible Products of Animal Origin, NES	0.11	0	-	-
Guts, Bladders, Stomachs of Animals (Not Fish)	0	0.04	Latvia	78%
Fats of Bovine Animals	11.77	1.51	-	-
Other Animal Fats and Oil and their Fractions	0.36	0.06	-	-
Total	21.53	4.26		
Major Trading partners for import of By-products	India			

Source: Authors' calculation based on data from State bank of Pakistan

EDITORIAL TEAM

Prof. Dr. Rana Muhammad Ayyub is currently serving as Chairman of the Department of Economics and Business Management, UVAS Business School. He completed his doctoral degree in Marketing from Hull University Business School (HUBS), University of Hull, England, UK. He has been serving as Director of CAPRIL (Center for Applied Policy Research in Livestock) since 2015. He has written many policy papers regarding various issues of the livestock sector which have been quite instrumental in shaping the Government policies. He has been providing professional consultancy services to the private meat industry of Pakistan since 2004. He has also served as a consultant USAID for conducting research studies. He has also completed funded research projects for Pakistan Poultry Association (PPA) on various marketing issues. He has published in reputed journals including ABS and ABDC ranked journals.

Dr. Muhammad Imran is working as an Assistant Professor in Department of Economics and Business Management, UVAS. He has completed his Ph.D. in Agricultural Economics from Akdeniz University, Turkey on a scholarship from Turkish Government. Dr. Imran has also studied one semester in Debrecen University (Hungary) as an exchange student which was funded by Erasmus program of European Union. With funding from DAAD he participated in training programs at Energy Economics School of University Cologne (Germany). His research interests include rural development, rural energy economics, energy efficiency, resource economics, and climate change. In extracurricular, he is President Gold Medalist in Scouting.

Dr. Muhammad Ijaz is currently working as an Associate Professor (Tenured)/Incharge Outdoor Hospital in the Department of Veterinary Medicine, UVAS Lahore. He completed his PhD (Pak-USA) and Post-doc from Cornell University, USA. He is an HEC approved supervisor and has supervised 7 PhD and 28 MPhil students. His research achievements include 3 research projects as PI, 141 research manuscripts/reviews with cumulative Impact Factor of 166.328; 7 books/booklets; 3 book chapters and 57 published abstracts. He has been awarded with Best University Teacher Award-2015 from Higher Education of Pakistan. Recently, He has been nominated by the Govt. of Pakistan to serve as a member of Scientific Commission of Animal Sciences of OIE.

Dr. Muhammad Hassan Mushtaq graduated as Doctor of Veterinary Medicine from College of Veterianry Sciences, University of Agriculture, Faisalabad, Pakistan in year 2000. Afterwards did M.Sc. (Hons.) in Veterinary Pathology from University of Veterinary and Animal Sciences, Lahore in year 2003. He joined Hi-Tech Poultry Breeders Pvt Ltd and worked at farm and diagnostic laboratory of the company. He was awarded scholarship for PhD studies from overseas through Higher Education Commission of Pakistan in 2005 and completed doctoral degree in subject of Preventive Veterinary Medicine in year 2008 from P. R. China. His research work has been published in refereed journals including SCI listed journals and he has presented in international conferences.

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University of Veterinary & Animal Sciences
Sheikh Abdul Qadir Jillani Road (Outfall) Lahore - Pakistan
Ph: +92-42-99211374, Ext: 339, 340
www.uvas.edu.pk