



# Cattle meat value chain analysis in Khyber Pakhtunkhwa

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## **Disclaimer**

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## ABBREVIATIONS

ADB	Asian Development Bank
ADP	Annual Development Plan
ASF	Agribusiness Support Fund
BPS	Basic Pay Scale
BR&DS	Bio-Technical Research and Development Section
CAB's	Conformity Assessment Bodies
CABI	Centre for Agriculture and Biosciences International
CPEC	China Pakistan Economic Corridor
DFAT	Department of Foreign Affairs and Trade
DFID	Department for International Development
DOA	Department of Agriculture
DOF	Department of Fisheries
EU	European Union
FAO	Food and Agriculture Organization (United Nations)
FDG's	Focused Group Discussions
GHP	Good Handling Practice
GIS	Geographic Information System
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis and Critical Control Points
HDPE	High-density polyethylene
ICT	Information and Communication Technology
IDI's	In-Depth Interviews
IFAD	International Fund for Agricultural Development
IHN	Infectious Hematopoietic Necrosis
ILO	International Labor Organization
INGO's	International Non-Governmental Organizations
IPM	Integrated Pest Management
JICA	Japan International Cooperation Agency
KG	Kilograms
KII	Key Informant Interviews
KKH	Karakorum Highway
KM	Kilometers
KPK	Khyber Pakhtunkhwa
LDC	Lower Division Clerk
LSO	Local Support Organization
M&E	Monitoring and Evaluation
MNFSR	Ministry of National Food Security and Research
MOST	Ministry of Science and Technology
MOU	Memorandum of Understanding
MRA's	Mutual Recognition Agreements
MT	Million Ton
NGO's	Non-Governmental Organizations
NMI	National Metrology Institute



OFWM	On Farm Water Management
P&D	Planning and Development
O&M	Operation and Maintenance
AAID	Project Agribusiness and Agro-industry Development
PARC	Pakistan Agriculture Research Council
PC1	Project Concept 1
PCSIR	Pakistan Council of Scientific and Industrial Research
PIA	Pakistan International Airline
PKR	Pakistani Rupee
PM&ERS	Pest Management and Environmental Research Section
PME	Planning Monitoring and Evaluation
PNAC	Pakistan National Accreditation Council
PPAF	Pakistan Poverty Alleviation Fund
PSDP	Public-Sector Development Program
PSQCA	Pakistan Standards and Quality Control Authority
R&D	Research and Development
SMS	Subject-Matter Specialist
QI	Quality Infrastructure
T&V	Training and Visit System of Extension
TDAP	Trade Development Authority of Pakistan
TOT	Training of Trainers
TRTA	Trade Related Technical Assistance
UAE	United Arab Emirates
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
USD	United States Dollar
VC	Value Chain
VCA	Value Chain Assessment
WFP	World Food Program
ZTBL	Zarai Taraqati Bank Ltd



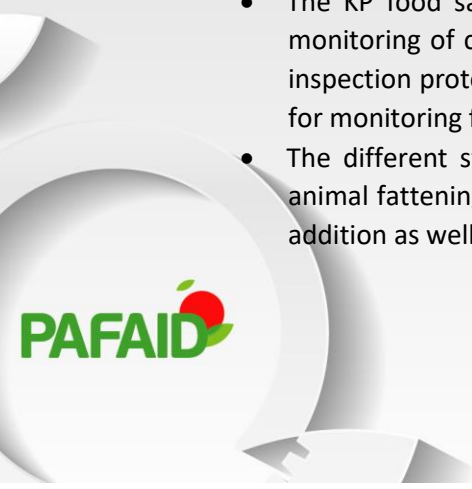
## Executive summary

Globally, demand for meat and meat products is on rise especially in Asia. Pakistan is an agricultural country with livestock sector as major segment of agriculture, contributed 11.2% (for year 2018-19) in national gross domestic product (GDP) whereas share in agriculture was 60.54% with net growth increase for 4% compared to 3.8% for 2017-18 (GOP, 2019). Pakistani are meat-loving nation and especially beef is much liked in Khyber Pakhtunkhwa (KP) province thus there is a huge demand of red meat especially of cattle meat. Additionally, due to the availability of pastures here, the meat of the animal is like organic and thus encouraging farmers to rear cattle's especially in Peshawar followed by D.I. Khan, Abbottabad whereas least production in the Kohistan region of the province. In addition, due to the closer access to Afghanistan, mainly the export of all beef from Pakistan is also done from Peshawar and this turnover of export is increasing day by day that is also encouraging different stakeholders of the cattle meat value chain in KP. Furthermore, the KP province is hub of the national as well as international tourist activities, which is on rise that also generates a lot of demand for cattle meat and meat based products. The local as well as export demand is also forcing the shift of the local rearing from subsistence farming to the commercial farming in the province that will also change the dynamics of the cattle meat in future.

Food borne diseases are rampant in the developing countries mainly due to poor handling and sanitation practices that can lead to production and processing of contaminated foods particularly of animal origin like meat and meat products. Pakistani prefer to consume fresh meat mostly sold in the butchery shops and retail outlets that is one of the major contributors of food borne diseases due to lack of poor food safety practices at abattoirs/slaughterhouse, butchery shops and retail outlets. The municipal facilities and slaughterhouses in developing world especially in Pakistan are of substandard quality and their prospects for improvements are very poor. These facilities are characterized by old buildings, damaged infrastructure and chronically bad hygiene and operational issues thus these facilities pose significant hazard to human health as well as welfare of workers, livestock, meat consumers and environment. Similarly, cattle meat value chain facilities like animal mandi, butchery shops, slaughterhouses are not much different from rest of Pakistan however, the situation needs a huge improvement in sense of cattle meat supply chain in selected districts of KP as this province is facing same problem of poor food safety compliance, weak regulatory framework and inspection protocols and most importantly lack of technical knowledge needed for establishment of the food safety compliance of cattle meat value chain. After slaughtering the meat animals, the meat carcass are mostly transported in local vans that are without any cold chain facility and then sold in the butchery shops/meat outlets by hanging outside of butchery shops that is exposed to dust, microbes and contaminant that can adversely affect the quality and microbial safety of fresh cattle meat. Also, some time, the meat carcass is transported in open vans without any covering material that further aggravate the food safety compliance and the slaughterhouse facilities in KP province are mostly located away from the major roads in low lying areas and the situation becomes more worse especially in rainy season. Overall, the existing situation at animal mandi, municipal slaughterhouses, butchery shops and meat markets are poor and do not meet the standard protocol for animal slaughtering, transportation and storage for meat as per best international hygienic practices. In Peshawar, which is the biggest and major metropolitan city of KP, the government owned slaughterhouse facilities that are providing meat to local consumers are very bad that needs immediate intervention for the improvement of the meat slaughterhouses and still the conditions are worst in other districts of province like D.I Khan, Abbottabad and Kohistan. The

butchery shops are also not adopting the good manufacturing practices (GMP), good hygiene practices (GHP) and food safety guidelines as well as butchers involved in slaughtering, meat cutting and product development lack skills and knowledge for the food safety compliance of fresh meat and meat products. However, prevailing conditions as well as consumers attitude is encouraging the private stakeholders to develop some new meat shops /hypermarkets in Peshawar city that are engaged in providing comparatively hygienic meat with refrigeration and chilling facilities to the consumers however; they still lack knowledge for the food safety compliance as well as butchers need training and skills for cutting, meat handling practices and storage. The main findings of the project are as below

- Livestock is one of the major contributor in agriculture of province and KP has potential for the growth and development of livestock particularly of cattle meat animals due to presence of natural resources and meat preferences by locals
- Majority farmers (>90%) in KP involved in livestock production are rearing animals as subsistence farming that need to be changed from subsistence to commercial farming for better managing animal's health, rearing facilities, commercialization & marketing as well as food safety compliance
- Currently, no different breeds for meat animals exist and mainly milk animals are considered and used as meat animals that demands for the development of meat breed of animals
- The animal mandi mostly are lying in the lower area and away from major road facilities and have very week food safety situation.
- The government slaughterhouse that are used for major animal slaughtering for local consumers are in very bad conditions with poor food safety compliance
- The slaughterhouse facilities that are used for meat export are comparatively better from local facilities and lack international best practices and food safety certification
- The major fresh meat to consumers is province is provided by butchery shops and majority of shops do not meet basic food safety compliance and international best practices
- Some butchery shops in the province lack electricity facility, water availability and have sewerage facilities in front of shops as well as majority do not have any refrigeration facilities
- There is strong need of the harmonization of role of different government departments to develop cattle meat value chain on scientific basis and the role of the different department need to be reoriented for improving food safety compliance of cattle value chain
- The government department of KP do not have sufficient legislation and knowledge for monitoring cattle meat value chain especially slaughtering, adulteration, microbial analysis as well as differentiation of halal vs non halal animal meat adulteration and need training on these aspects for the development of the value chain
- Livestock department providing services to farmers including animal health monitoring, disease diagnosis, vaccination and deworming but they lack slaughtering, testing & analysis facility, meat inspection and value addition facility for cattle meat
- The KP food safety and halal food authority having mandate for inspection, testing and monitoring of cattle meat butchery shops lack legislation for live animal and meat carcass, inspection protocol and especially testing facilities including classical as well as rapid toolkits for monitoring food safety compliance
- The different stakeholders of cattle value chain do not have adequate knowledge about animal fattening, meat inspection & international best practices, meat processing and value addition as well as food safety compliance



- Non-existence of testing and analytical facility for monitoring meat value chain that need to established for scientific verification and improving food safety compliance
- There is trend for establishment of new meat shops with glass door due to consumers demand but still they do not meet up food safety compliance
- Recently, there is trend for establishment of fattening farms due to support of government and the efforts of livestock department that have impact in the cattle value chain development in future
- China Pakistan economic development corridor (CPEC) is creating a lot of opportunities as Chinese and Turkey are interested in to export Pakistani meat that can boost economic activity but the food safety compliance is major challenge to meet their demand
- Non-existence of the cattle meat export policy and especially meatless days issues for the exporters that is also discouraging the meat exporters
- Animal Husbandry In-service Training Institute (AHITA), a part of the livestock department is offering training program on animal's farm establishment, monitoring animal health & diseases, forages and feed requirement of animals but they lack training module on food safety compliance, processing and value addition for training of relevant stakeholders regarding cattle value chain
- Non-existence of the training program for food safety compliance, animals slaughtering & butchery operations with international best practices as well as meat testing and analysis hands on training for butchers and other stakeholders is direly needed for the improvement of food safety compliance
- The farmers and butcher's association are present in KP but mostly they are not actively engaged in any activities that can boost livestock and cattle value chain in the province
- There is a rising demand of cattle meat byproducts like liver, stomach and intestine from China and their market may be established in future by adopting good hygiene practices
- Previously, there has been funding in cattle value chain from donor agencies including the establishment of planning and monitoring sections as well as (AHITA) but their operations and working efficiency ceased after the completions of the projects. So, there is a dire need of the sustainable solutions for the cattle meat value chain that can have impact for food safety compliance in the KP province.



# 1. INTRODUCTION

## 1.1 Short description of the project

The project Agri-food and agro-industry development assistance in Pakistan (PAFAID) – Initiative for Khyber-Pakhtunkhwa and Balochistan aims at supporting quality and safety improvement as well as introduction of value addition for apple and livestock sector particularly cattle value chain at a sustainable manner and in turn improves the livelihood of the stakeholders. The ultimate goal of the assistance is to avail provinces of Pakistan with better products for its local market by decreasing post-harvest losses & wastage and improving food safety compliance, as well as gaining competitive advantage in local food production when it comes to export to regional and international markets.

The project, based on UNIDO value chain development approach firstly focused on Khyber-Pakhtunkhwa livestock sector, in particular cattle meat value chain. The beneficiaries of the project include all members of the cattle value chain ranging from the Government of Pakistan, namely the Ministry of National Food Security & Research of Pakistan, to provincial ministries and government related institutions like KP Livestock and dairy development (extension) department, KP Food Safety and Halal food authority to the rural communities, agro-producers including farmers, slaughterers, carcass transporters, meat exporters, butchers, wholesalers and retailers of Khyber-Pakhtunkhwa province. The expected priority impact of project implementation is creation of new job opportunities originating from employment prospects in agro-processing sector.

The Government of Pakistan requested UNIDO to develop conceptual intervention approach, which aimed to develop agricultural extension services of provincial agriculture department particularly livestock and dairy development department and simultaneously enhance obsolete practices of agri-food value chain that are one of the major constraints in the food safety compliance of the food produced. In 2018, the Government of Japan approached UNIDO and the Japan International Cooperation Agency (JICA) to develop a project based on the approach of improving agricultural extension services by piloting activities in the selected value chains. One of those, the UNIDO assistance aim at supporting enhancement of productive and compliance capacities of cattle value chain in Khyber Pakhtunkhwa. The long-term goal of this intervention is to revitalize livelihood of cattle meat value chain actors in KPK through the introduction of international best practices for food safety compliance of cattle meat value chain that can protect the health of the local consumers as well as create competitive market for the export of cattle meat and meat products to the high end international markets. The project has following main outputs responding to need of the agricultural sector as shown below in Table 1.

## 1.2 Objective of this assignment

One of the long-term goals of project is to revitalize livelihood of cattle meat value chain stakeholders in Khyber-Pakhtunkhwa province by improving practices of cattle farmers, butchers, slaughterhouses, meat handling and food manufacturers & processors along with related enabling environment for production and processing of safe and health cattle meat and meat products for human consumption. To achieve this, the short-term goal of the project is to introduce food safety practices and skills in the relevant stakeholders that can impact the cattle meat quality, safety and

productivity of the local enterprises, which in turn will able them to generate additional incomes by selling their product with food safety compliance in high-end markets.

The major objective of the assignment is to conduct different components of PAFAID project including; (a) an in-depth value chain analysis of different stakeholders for developing cattle value chain considering UNIDO value chain development approach in selected districts (Peshawar, Abbottabad, D.I. Khan and Kohistan) of Khyber Pakhtunkhwa Province of Pakistan, (b) to develop technical and feasibility studies as part of roadmap for cattle value chain (c) to conduct need assessment of the Department of Livestock and Dairy Development (Extension) department and KP Food Safety and Halal Food Authority. The programmatic scope of the assignment is shown below (Table 1).

Table 1 Programmatic scope of PAFAID project assignment in inception phase for cattle value chain

Project Output	
Value Chain Analysis	Value chain analysis of cattle meat value chain in selected districts of KP Province and roadmaps for their upgrade
Needs Assessment of the stakeholder departments	Needs assessment of KP livestock and dairy development (extension) department, KP food safety and halal food authority, farmers association, butcher's association, meat exporters and butchery shops in KP to support local cattle value chain
Financial and Technical Feasibility Studies	Financial and technical feasibility studies on upgrade of cattle value chain in selected districts of KP and their supporting infrastructure for following: i. Establishment of model meat shops ii. Establishment of model meat slaughterhouse iii. Establishment of meat processing unit iv. cattle meat animal byproducts utilization and value addition

### 1.3 Methodology of the assessment

The assignment was conducted using the UNIDO value chain development approach that aimed to focus on those areas which lead to improvements in value chain performance in terms of (i) increasing quantity and improving regularity and continuity of cattle meat animal production; (ii) improving the quality and safety of cattle meat, processed meat products and value added meat byproducts; (iii) reducing the time products needed to reach the customer; (iv) minimizing transactional costs; and (v) improving the capacity of different value chain actors to follow and assimilate food safety compliance, technology and market developments leading towards industrial and economic development activities that can develop cattle meat value chain.

To facilitate a clear understanding of the project and enable an effective study design, a comprehensive desk review was undertaken at the onset of the assignment. First of all, the Khyber Pakhtunkhwa livestock Policy 2018 document reviewed that actually depicts basic facts of livestock in KP, their potential, animal health and related facilities offered by the livestock department as well as future road map of livestock improvement in the province was taken into consideration through this policy document (Livestock KP policy, 2018). Additionally, the key project documents and UNIDO-related documents especially the value chain analysis; A UNIDO approach were taken into consideration for the development of the cattle meat value chain in selected districts of KP. In addition, project documents along with their reports like "Developing sustainable value chains for small-scale livestock producers" by United Nations Food and Agriculture Organization (FAO), "Meat



value chain assessment by the livestock sector in Pakistan” by the USAID agribusiness project, “Livestock development project” by the Asian Development Bank, “Pre-feasibility Study modern slaughter house (Abattoir) for cattle only” by Sindh board of investment, Government of Sindh, Pakistan “Pre-feasibility study for meat processing unit and slaughterhouse” by Small and medium enterprises development authority (SMEDA), Ministry of Industries & Production, Government of Pakistan as well as publications on relevant value chain and feasibility studies conducted by government departments, donor funded projects, NGOs/INGOs, aid agencies, and private sector organizations were also reviewed before commencement of value chain analysis. The detail of different documents reviewed for completing cattle value chain assessment be found in the Annexure (I).

## **1.4 Data collection mechanism**

### **1.4.1 Primary data sources**

#### **1.4.1.1. Meeting with relevant stakeholders**

After the inception meeting with, a series of meetings were conducted in Peshawar by the UNIDO project team with relevant stakeholders like Khyber Pakhtunkhwa (KP) Department of Agriculture, KP Livestock & Dairy Development Department, KP Food Safety and Halal Food Authority, Bank of Khyber, Meat exporters (Munir and Co. meat company), butchery shops and slaughterhouses for baseline data collection on cattle value chain in selected districts of Khyber Pakhtunkhwa, Pakistan. The first stakeholders meeting was hold in the Livestock & Dairy Development Department (Extension) where its Director General briefed project team about livestock sector in the KP province, their mandate and departmental activities as well as briefed on the completed as well as on-going research and capacity building activities related to livestock with special focus on cattle value chain. They took keen interest in the UNIDO project and assured full support to improve food safety compliance as well as improve cattle value chain that will definitely improve safety and quality compliance of cattle meat and meat products thus improving livelihood and health of peoples. Afterwards, KP Food Safety and Halaal Food Authority representatives meeting was conducted to gain understanding on the status of the authority and identify potential synergies between their immediate needs and planned project activities. The project team also visited Bank of Khyber for discussing financial loan possibilities for butchery shops and slaughterhouses as one of the major banks offering livestock loan scheme in the province. The bank representative discussed loans requirements and financing options as well as briefed a successful model for purchase of Holstein Friesians cow in one of the districts in KP in which bank of the Khyber provided loan for purchase of cows and farmers are paying loan from milk they are selling on regular basis. Afterwards, the project team visited the slaughterhouse by the Munir and Co. meat company that is one of the major facilities for meat export to Afghanistan. The company is also running the largest government owned slaughterhouse that is providing the slaughtering facility for the local animals of the Peshawar.

#### **1.4.1.2 Development of surveys and questionnaires**

In order to systematically collect the data from different stakeholders of cattle value chain in selected districts of the province, questionnaires and templates were developed for gathering data through Key Informant Interviews (KIIs), In-depth interviews (IDIs) and Focus Group Discussions (FGDs) to conduct need-based cattle value chain analysis with different stakeholders in the province. For KP food Safety and Halal food authority, the survey questionnaire include set of questions regarding institutional organization setup, gender distribution, program planning unit and its function, monitoring and evaluation mechanism functionality, impact assessment, staff training and

in-service training program for authority employees, Legislation & inspection procedures, testing facilities, food safety approach, inter-directorate coordination, assessment of non-government actors involvement especially cattle value chain in decision making, constraints as well as future needs of the authority for developing cattle value chain in the province. Similarly, the questionnaire for livestock and dairy development department include aspects regarding institutional setup, gender distribution, planning unit, monitoring and evaluation mechanism functionality, staff training program, Legislation and testing facilities, inter-directorate coordination, non-government actors and their role in cattle value chain development, constraints and future needs of department. Additionally, the similar approach used for the Key Informant Interviews (KIIs) such as meat exporters, meat processors as well as in-depth interviews conducted with Butchers of meat shops, stores and hypermarket involved in selling cattle meat to access food safety compliance of value chain. Likewise, focus group discussion were done with representatives of farmers and butchers association regarding operational role of association, services they are providing to farmers and butchers, their role in animals and feed ingredients procurement, marketing, and value addition of cattle meat value chain. The objective of all these activities was to find the current needs from compliance and productive capacities perspective and provide recommendations that are helpful for devising future road map for food safety compliance of cattle meat and overall growth and development of cattle value chain in selected districts of KP.

For additional sample data collection from the different district, UNIDO has subcontracted a consulting company which has collected socio-economic and compliance related data on different stakeholders of cattle value chain. For this reason, IAG has developed in collaboration with UNIDO project team a list of short surveys which fit for approaching a large amount people by defining adequate sample size. The sample size was collected through the definition of estimated population size received from governmental officials. They have selected farmers, butchers and butchery shops owners using non-probability sampling of 3% of the population who were interviewed for this task. Additionally, participants like farmers and butchers in value chain were selected considering farm size and meat shop type (big, medium, small) in each *tehsil*<sup>1</sup> of chosen districts. Additionally, other participants like middlemen or *arthti*<sup>2</sup>, meat exporters and retailers were chosen proportionately to their availability in selected provinces of KP. The questionnaire template used for various stakeholders for data collection are found in Annexure (II).

During the assessment, the UNIDO project team ensured collection and analysis of both qualitative and quantitative data through primary and secondary resources. Data collected from one source was triangulated with other to ensure accuracy and validity. The assessments carried out in a participatory manner, where feedback gathered from multiple stakeholders including various governmental departments, butchers association, farmer association, value chain agents, meat exporters, slaughterhouse owners, hypermarkets, butchery shops owners/butchers and representatives of both public and private institutions and donor agencies were approached for completing the data collection for the project. In addition to interviews and site observations, the project team also reviewed reports, presentations, and publications provided by the livestock and dairy development department and food Safety and Halal Food authority as well as feasibility studies

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<sup>1</sup> In Pakistan, a tehsil is an administrative sub-division of a District. Those are sub-divided into union councils

<sup>2</sup> Arthti is actually a person whose main function is purchasing crops or animals from farmers and serve as a kind of mini-bank, input resources on credit, and often serving as money guards that hold onto smallholders' savings.



of the Small and Medium Enterprises Development Authority (SMEDA) and project reports by the Asian Development bank, USAID and JICA for the analysis of value chain.

Table 2 Snapshot of geographic scope and stakeholders consulted

Geographic Scope	Type of Stakeholder	Stakeholders Consulted	Tools Utilized
Peshawar	Public	<p>Secretary Agriculture, KP</p> <ul style="list-style-type: none"> <li>Directors and staff of the Livestock and dairy development Department of KP (Extension)</li> <li>Director general and Staff of KP Food safety and Halal Food authority Peshawar</li> </ul>	Key Informant Interviews
	Private	<ul style="list-style-type: none"> <li>Value Chain Agents operating in regional, national and international markets (where available) such as meat butchery shops, slaughterhouses, supermarkets, meat stores and exporters</li> <li>Service providers (butchers, slaughterer transporters, traders, retailers, meat processor, wholesalers, and meat, etc.)</li> </ul>	In-depth Interviews Feasibility Templates
	Farmers association	<ul style="list-style-type: none"> <li>Representatives of farmers association in Peshawar</li> </ul>	Focus Group Discussions
	Butchers association	<ul style="list-style-type: none"> <li>Representatives of Butchers association in Peshawar</li> </ul>	



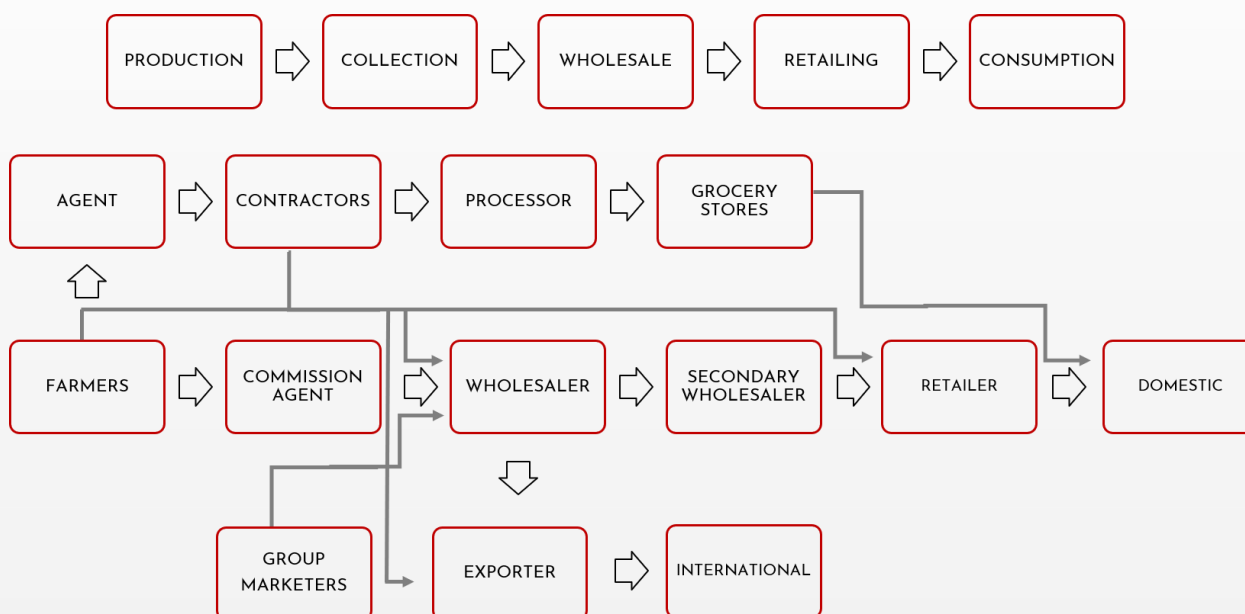
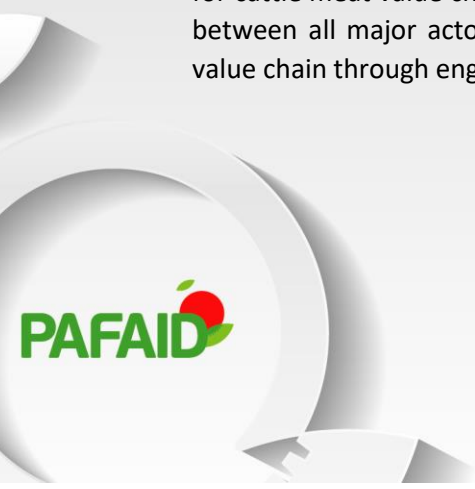


Figure 1 General flow line of different Stakeholders involved in value chain of agri-foods

### 1.4.2 Secondary data sources

For the needs assessment of cattle value chain, the secondary data was collected using publicly available datasets (e.g. Pakistan bureau of statistics, Provincial development statistics, Population Census 2017, Agriculture Census 2010, and Livestock Census 2006) and those in possession of relevant government departments in each province. Using above-mentioned sources, the district-level populations were estimated for each population category of interest. The population sizes were then used to extract a sample for primary data collection. Using non-probability sampling, 3% of total population was decided to be interviewed during primary data collection for different stakeholders like farmers, butchers and butchery shops owners. Additionally, the participants like farmers and butchers in cattle meat value chain were chosen considering size of cattle farm and meat shop (big, medium, small) in each tehsil of selected districts. In addition, the other participants like middlemen/aarhati, meat exporters and retailers were selected proportionately to their availability in the selected provinces of KP. Furthermore, 5% of the participants for value chain were selected from peri-urban/urban areas and chosen proportionately from high, medium and low-income groups for data collection.

The survey tools for each population category designed using preliminary findings from Focus Group Discussions and input from various technical and field experts. Each tool has different set of questions so not to overwhelm the participants and to collect maximum possible data that is useful for cattle meat value chain analysis. Additionally, the survey tools aimed to explore value chain links between all major actors and to access existing level of food safety compliance/regulation in the value chain through engaging relevant stakeholders.



## **2. Value chain analysis**

### **2.1 Overview of the value chain in Pakistan**

The agricultural sector (in a broader category, inclusive of livestock) is a backbone of Pakistan's economy and society in that it contributes 11.2% of GDP and provides productive as well as living space for as many as 2/3 of the entire population. Among the agriculture contribution in the national GDP the share of the livestock in agriculture was 60.54% with a net growth increase for 4% compared to 3.8% for year 2017-18. The livestock sector provides food of animal origin to a population of more than 30.52 million people of which 82% are rural dwellers having dependence on agriculture and livestock. Additionally, the country has 40 million herds for buffalo, 47.8 million herds for cattle and produced 21.691 million tons beef from cattle and 36.180 million tons meat from buffalo for the said year. Furthermore, the sector also produced livestock products including cattle hides 9.063 million and buffalo hides 8.373 million for 2018-19. The livestock sector is one of major source of foreign exchange earnings (3.1%) to total Pakistan exports and is source of 35-40% of income for more than 8 million rural families as well as provide food security by providing high biological value protein of animal origin (Economic Survey of Pakistan, 2019). Moreover, the KP province whose major population is dependent on agriculture produced 2.041-million-ton fodder, 5.896-million-ton milk, and 580.410-ton meat during the year 2016-17.

### **2.2 Food safety challenges**

Food Safety is one of the vital pillars in the growth and development of the healthy nation as linked with reduced food borne diseases thereby protecting consumer's health. However, in developing countries like Pakistan, importance of food safety has been neglected for a longer time and the cases of food borne illness are on rise due to availability of unsafe and adulterated food products for consumers. The major factors behind increasing foodborne diseases that is affecting majority of Pakistani population are lack of knowledge regarding food safety, poor food safety laws/regulations, weak regulatory framework as well as lack of analytical facilities especially unavailability of rapid toolkits for analysis to detect food adulterants. The availability of safe and hygienic food which is one of the basic essential is rare in the developing countries and is rampant in Pakistan (Abrahamson et al. 2017). In developed economies, food safety compliance is mandatory for every raw and processed foods. In addition, animal origin foods like milk, meat and meat products are more perishable due to their higher moisture level and presence of nutrients, which also favor growth of microbes. For this reason, these foods need strict oversight from farm to fork in order to prevent the occurrence of food borne diseases. The overall food safety system in Pakistan is not yet well developed and need a lot of improvements in this area are required for meeting with requirements of international food safety requirements. The food safety domain was neglected in last decade in the country mainly due to lack of knowledge and governmental support to improve the situation. However, recently people started to realize importance of food safety due to awareness and government involvement as indicated by establishment of regulatory agencies like Punjab food authority (PFA), KP Food Safety and Halal Food Authority (KPFSHFA), Sindh Food Authority (SFA) and Balochistan food authority (BFA) that will create difference in food safety compliance of food products in Pakistan in future. Among these, the KPFSHFA, SFA, BFA are the newly established regulatory organization and still lack the food safety standard setting, the food control and testing functions. From the side of the industry, compliance capacities and value

addition of cattle value chain are needed to be improved thus facilitating meat safety and quality compliance capacities in Khyber Pakhtunkhwa.

The prevailing conditions at municipal slaughterhouses, animal mandi, meat markets and butchery shops are poor and do not meet requirements for animal slaughtering, carcass transportation, meat and carcass storage and butchery operations. The food safety compliance is not up to mark in Pakistan and need substantial involvement as well as commitment of the stakeholders particularly of the regulatory department of the government for improving the existing food safety compliance of cattle meat value chain.

In Peshawar, which is the hub of all the stakeholders of cattle value chain and developed city of province, the government owned slaughterhouse facilities that are providing meat for local consumers is very bad and the situation is much worst in other districts of KP. The butchery shops lack implementation of good manufacturing practices (GMP), good hygiene practices (GHP) and food safety guidelines. Although a few meat stores/hypermarkets are developed recently that are selling the so-called hygienic meat to the consumers. Although, they still lack the skills for meat cutting and practical training needed for storage and meat handling practices.

Mostly, butchery shops, meat stores and slaughterhouses supply fresh beef as well as processed meat such as kabab to the consumer. There are few meat-processing companies like Euro Foods, Farmers Food and Continental Food that sell meat products like sausages, patties, kabab *etc.* Despite the existing local industry, only a small portion of the meat (less than 5% of total) is being processed with the major industry presence based in Peshawar. In addition, main meat export activities are also taking place only here due to its proximity mostly on road to Torkham borders via N5/AH1 (from Peshawar 55 Km from Peshawar or 2 hours to the Afghan border).

In addition, due to poor food safety compliance and roads connectivity, the Pakistani meat is mostly (about 90 percent of 250-300 tons) exported to the low end markets like Afghanistan that are offering meat price around 3.5 dollar/kg and the rest to United Arab Emirates (UAE), Bahrain and Qatar.

The cattle farming in KP is mainly micro or subsistence small-scale but is being replaced with commercial farming in recent years due to the engagement of livestock department and governmental support. There is a demand for quality red meat as locals prefer beef and per capita beef supply increases with similar rate of per capita income growth<sup>2</sup>. It has been observed that beef supply has increased at growth rates of population plus income per capita especially after improving law and order situation in KP province in the last 5 years. The growth rate of beef supply is increasing and is a potential to increase the cattle meat production in KP due to availability of alpine pastures and natural grassland and this meat is also favored by the export due to organic taste and flavor of red meat. Further, it implies sizable room for expanding meat consumption in future. Looking at demographic movement, the population in major cities has been increasing at rates higher than overall growth rate of population. In addition, the rate of urbanization is expected to rise continuously in future so the capacity to supply meat to urban areas be increased in rural areas.

Also, there is a huge potential to export halal meat to Islamic countries like Afghanistan and Middle-Eastern countries. The data showed that export of beef has been increasing since 2004 and all the beef exported to Afghanistan is from Peshawar that has led to the development of commercial slaughtering facilities in Peshawar for export purpose that is slaughtering local and animals from

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<sup>2</sup> Livestock development project ((LOAN 973-PAK[SF]) in Pakistan funded by the Asian Development Bank from August 1989 to February 1999.

Punjab. It is also important that regulatory enforcement (border testing control) for safety compliance are is very week in Afghanistan that favors Pakistan. It is natural consequence as KP has advantage over all other provinces in meat export to Afghanistan due to its location and nearness with Torkham border. In addition, there are other countries like Qatar, UAE and Kuwait that are interested in Pakistani meat and their regulation can be met with compliance of the food safety practices. Based on the interviews in livestock markets in KP, one of the respondents reported that even China and Turkey are interested in Pakistani red meat but the major issue in food safety compliance creates a hurdle for potential export.



Figure 2 Transport van used for movement of cattle meat animals in KP province

## 2.3 Overview of the cattle value chain in KP

### 2.3.1 Geographical location and economic background

Khyber Pakhtunkhwa formerly called North-West Frontier Province, is geographically smallest (area 101,741 Km<sup>2</sup>) of 4 provinces of Pakistan, contributing 10.5 % to national GDP and has 11.9% (35.53 million) of Pakistani population. The province surrounded by Mountains in north, Afghanistan in Northwest, Balochistan in south-west, Punjab in southeast and Gilgit-Baltistan and Azad Jammu & Kashmir in northeast. Its southern tip only 250 meters above sea level whereas, north elevation rises quickly reaching Hindu Kush and Karakorum with average height 3,000 meters. The Federally Administered Tribal Areas form border areas with Afghanistan consisting of 7 tribal agencies and 6 frontier regions that were previously governed by federal government has now become part of KP province. The climate of KP varies with elevation as mountain experience cold winters and cool summers however, the temperature in south rises markedly with average precipitation of 400 mm annually with most during monsoon season (PBS, 2017).

Livestock animals are important to Pakistan's economy which sector's total assets worth more than US \$19 billion and contributing approximately 11.9% to national GDP and more than 60.54% of value-added in agriculture. Culturally Khyber Pakhtunkhwa and federally administrated tribal areas (FATA) are strongly associated with livestock production, as meat and milk are staple food items, and more than 70% of families own ruminant livestock either subsistence or commercial farming. The



rangeland occupying 46% of total land area dominates as basis for animals' production. The landless producers and traditional subsistence farming with informal marketing arrangements contribute largest part to the livestock farming of the KP province. So far modern larger-scale systems have limited impact on the cattle production but this approach is changing with day-by-day (Livestock Policy 2018).

### 2.3.2 Variety of livestock in KP

The numbers of domestic animals reared in KP include buffalo, cattle, sheep and goat however, in KP the number of cattle is three times the number of buffaloes and farmers prefer buffalo milk to cow's milk but for the meat they prefer the cattle meat and mostly the small-scale farmers rearing 1-4 animals having mix farming system including cattle and buffalo. In addition, the numbers increased by 34% for cattle between 2006 and 2014. The milk and meat animals reared in KP are several indigenous livestock breeds of cows (Sahiwal) and buffalo (Nili Ravi, Azakheli) but over last few years, it has become common to keep exotic/crossbred cow. The livestock farming is predominantly subsistence which feeds more than 70% livestock population. Moreover, only 3% of livestock population is in peri-urban commercial farms with approximately over 30 animals each. With continuous rising demand for livestock products, the smallholder subsistence livestock farming is now slowly started being replaced by semi-commercial farming setups in rural and peri-urban areas. Additionally, in Khyber Pakhtunkhwa 30-40% of livestock is kept by nomadic farmers that are mostly dependent on the availability of grazing resources in the provinces. In winter, they mostly graze animals on uncultivated areas and on crop stubble after harvests and in summer, they move their animals to alpine pastures for rearing and grazing of the animals. The availability of these grasses and climate change pattern may affect these animal rearing systems that need to be kept in mind for future plans.

Tabla 3 Profile of Livestock Sector in Khyber Pakhtunkhwa

Species	2006 (Million)	2019 (Million)
Cattle	4.23	10.04
Buffaloes	1.39	3.13
Sheep	2.82	4.3
Goats	6.67	16.18

(All the information has been collected from Economic review of KPK 2018-19)

### 2.3.3 Market access

The KP province located northwest of capital of Pakistan, Islamabad and Peshawar, is connected with Islamabad via (Islamabad Peshawar Motorway), and it takes about 2 hours' drive between two cities. The trade route for export to Afghanistan is connected by the N5 Highway from Peshawar that is one of the oldest trade roots for connecting the South region of Pakistan with the Torkham border. Also, some major cities of Southern KP like D.I. Khan and Banu are located along N-55, the major road from Peshawar to Balochistan. Additionally, some major cities of Northern KP such as Abbottabad and Haripur are located along the Karakorum highway which extends from Islamabad to Gilgit-Baltistan. There is a huge market for cattle meat for local as well as export to Afghanistan and Middle East countries. One of the respondents during our interview reported that China is looking for Pakistani beef that will change dynamics for cattle meat production, marketing and overall cattle value chain in KP as the KP province is the strategically closest proximity for the export of cattle meat to the Afghanistan and china. However, animal production potential is highest in the

Peshawar and D.I. Khan followed by Abbottabad and Kohistan whereas, meat consumption is highest in Peshawar followed by Abbottabad, D.I. Khan and Kohistan, respectively. Abbottabad is city of Hazara region located in eastern part of Khyber Pakhtunkhwa that is part of sub-humid eastern mountains and wet mountains agro ecological zones of province. The city has population and area 1.3 million, 1967 km<sup>2</sup>, respectively. Highest temperature in Abbottabad rise as high as 38 °C in summer and can drop below –5 °C during winter. The city has 2<sup>nd</sup> highest meat consumption demand after Peshawar by local population as well as attract lot of tourist on annual basis.

Dera Ismail Khan that is also known as D.I. Khan, is city of KP province situated Indus River with area 9,334 km<sup>2</sup> and 1.6 million population (PBS 2017). The D.I. Khan is part of piedmont plain and Suleiman piedmont with hot desert climate. The city is connected to Banu and Peshawar via highway as well as connected via Mianwali through Chashma and through Bhakkar in Punjab. Additionally, D.I Khan connected through Hakla–Dera Ismail Khan via Motorway and is known for cattle meat animals rearing as is the 2<sup>nd</sup> largest city for cattle meat animal production. Also, the Kohistan is small city of the KP province that is famous for dramatic scenery views and shares border with Kashmir/ Gilgit Baltistan and Swat. The city is part of sub-humid eastern and wet mountains zone of KP with area (7492 km<sup>2</sup>) and 0.78 million population (PBS, 2017). Kohistan experience extremely hot weather in summer and extremely cold in winters and is surrounded by the mountains which makes road connectivity very difficult at the moment. The city has meat animals but commercial activities like butchery shops and production is least among selected districts of KP mainly because of the harsh living conditions, least connectivity with roads as well as less opportunities for earning so majority meat animals reared in this area are sold and consumed to meet the local demand.



Figure 3 Main slaughterhouse facility used for animal slaughtering in Peshawar

Peshawar is one of the oldest cities of Pakistan and is capital of Khyber Pakhtunkhwa province with estimated area and population 1257 km<sup>2</sup>, 1.970, 042 million, respectively (Population Census, 2017). This city is actually part of central valley plain of the province that is a division of KP based on 4 agro-ecological zones considering climate, rainfall, temperature, altitude, and topography of province. This zonal distribution helpful to identify potential future impacts from external factors like climate change on the agriculture, livestock farming and animal husbandry practices. The average Peshawar temperature ranges 25 to 40 °C during summer and 4-8.35 °C in winter. The city is surrounded by mountains from 3 sides whereas, 4<sup>th</sup> side is connected with plains of Punjab. This city is major hub for commercial activities and is the largest market for the consumption of animal origin foods like milk and meat.

### 2.3.4 Role of women in cattle value chain

Women in rural areas of KP Province complete responsibility for not only reproductive work like household and childcare as well as productive work including agriculture and livestock. The work type and livestock management role of women depends on social norms like *purdah*, distance of agricultural fields from main roads, landholding size, household size, etc. In KP Province, animal husbandry is one of the most critical income sources as demand for dairy and meat products has increased in the urban areas so each household KP keeps 2 to 10 animals, including cows, buffaloes, sheep, and goat and chicken. Women play an active role in livestock production and rearing and help in various activities like animals for collecting fodder/grass for animals, feeding and watering, collecting manure, cleaning, milking, etc. Mostly they are solely responsible for indoor activities for animal rearing. Overall, women have great attachment with livestock due to economic reasons and raise them as family members. However, the role of women in livestock rearing in KP has always been underestimated mainly due to some cultural norms and they have no participation in animal marketing and share of income generated from sale of the animals (Andaleeb et al., 2017). A survey by FAO in 2015 revealed that women in northern, central, and southern areas feel that they are involved in all work necessary for livestock management, except selling and marketing of the animals. Additionally, 70% of women in northern areas feel that they take role in selling animals whereas, 5% and 35%, respectively feel like this in central and southern areas (FAO, 2015).

Table 4 Gender role in cattle meat value chain

Type of activity	Peshawar			Abbottabad			D.I Khan			Kohistan		
	Men	Women	Both	Men	Women	Both	Men	Women	Both	Men	Women	Both
Purchase of calves/animal												
Animal handling												
Purchase of inputs												
Provision of inputs												
Decision making												
Slaughtering												
Cutting and meat handling												
Post-harvest jobs												
Decision on sales												
Marketing												
Value addition of meat												
Income possession/utilization												





Figure 4 Cattle byproducts and skin storage facility in a slaughterhouse in Peshawar

## **2.4 Institutional assessment of Livestock and Dairy Development (Extension) Department of KP**

### **2.4.1 Mandate of the Department**

The Provisional Livestock and Dairy Development (L&DD), established in 1902 is an administrative and operational arm in charge on of livestock sector in KP, divided into two wings namely Extension and Research. The extension department provides services on animal health at district level whereas, latter has veterinary Research Institute in Peshawar and locates Veterinary Research & Disease Investigation Centers and Livestock Research & Development Stations in the province. The mission of (L&DD) Extension wing include livestock and poultry development through improvement of animal genetic resources, feed and fodder improvement, entrepreneurship development and market interventions, control of animal diseases through surveillance, diagnosis and treatment, capacity building of stakeholders through trainings mainly at Animal Health In-service Training Institute (AHITI), implementation of veterinary public health and other regulatory & compliance regime, transfer of technology at grass root level and collaboration with partner organizations. At districts level, the L&DD is providing services like veterinary treatment, artificial insemination (AI) and vaccination by veterinary officers (VOs) and veterinary assistants (VAs) posted at veterinary hospitals, dispensaries and centers including mobile clinics. In addition, the veterinary hospital located in the headquarters has a diagnostic laboratory providing basic diagnostic services to farmers.

### **2.4.2 Technical personnel of the Department**

The (L&DD) Extension department have 524 technical staff including Veterinary Officers (VO) and 1840 veterinary assistants (VA) whereas, 37 female VO & 71 female VA work in department for extension activities to the farmers. The department has 10% quota for female staff and as province has majority (90%) small farmers whereas production activities handled by women. However, the staff have mobility issues in far off areas. Also, female staff face difficulty for their outreach works like in difficult areas like Kohistan as well as deputation of women staff needs to be done especially in hard areas.

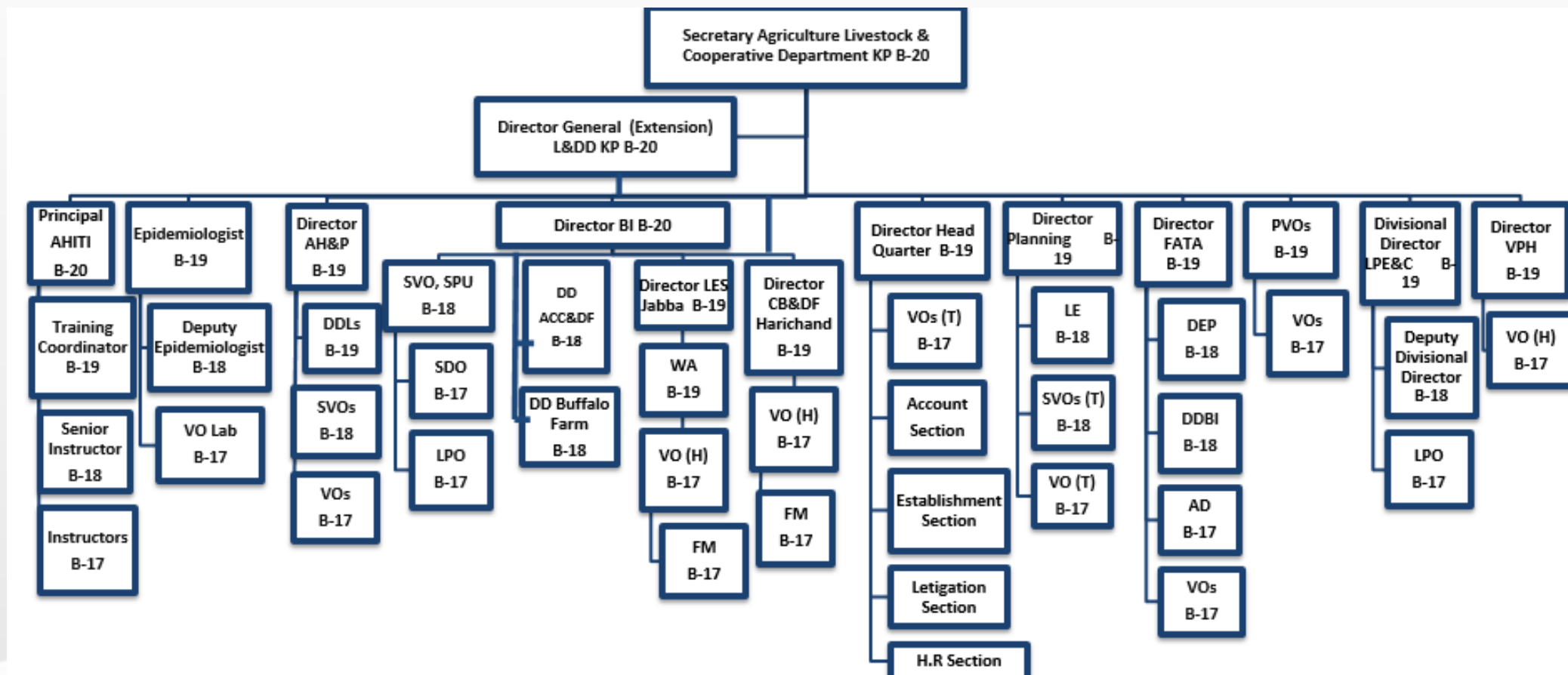


Figure 5 Organizational chart of KP Livestock and Dairy Development Department (extension)

### **2.4.3 Capacities and practices related to cattle meat value chain**

The Department is working for the cattle value chain and mainly engaged with local government, Health & Food Department and KP Food Safety and Halaal Food Authority as well as coordinate with farmers, middle man, slaughter houses, butchers and meat shops for technical assistance. The Department of Health in Khyber Pakhtunkhwa Province work to protect and improve health of the peoples by regulation, monitoring and provision of health services in order to achieve optimum benefit within available resources. The government's role is to act as guardian for health of citizens of KP Province to regulate as per international standards for quality of health care services & health care providers and medical training institutions. The food Department was created in sub-continent during 2<sup>nd</sup> World War to meet deficiency of food including wheat, wheat flour, rice and sugar. However, Food Department now work to improve people's life by providing quality wheat flour at reasonable prices whereas, safeguard wheat farmers interests by ensuring minimum guaranteed price for their produce. The department procure wheat to ensure Food Security, for issuance to mills, act as government agent to provide wheat purchase window to farmers at support price, protect wheat from pest and other hazards, export wheat and coordinate with other provinces and International Agencies for matters relating to wheat.

The L&DD department provides assistance in animal health and disease diagnosis with basic level facilities present in every districts whereas, about 20 districts have well established labs for monitoring animal health. Although the department lack meat laboratory for monitoring quality and safety aspects of cattle meat however, they are planning to establish this lab. Therefore, strengthening animal health facilities and helping to establish meat analysis lab and technical training will help to improve the cattle meat value chain. Also, the department has program-planning unit which has established KP livestock policy 2018 with 5-year agenda for livestock development in KP and they director general, Section Heads and technical staff including veterinary officers participate in planning meetings on monthly basis. These planning meetings are beneficial and key components to discuss department's progress however, the planning unit needs strengthening for better performance for policy and actions in future. The department training programs for new induction as well as in-service trainings which are mainly conducted at AHITI involve technical aspects of livestock handling, disease diagnosis and farm establishment & management. The department lack trainers and training course on cattle meat value chain especially halal slaughtering, food safety compliance, halal certification, meat testing, butchers trainings for safety compliance so training of trainers (TOT) courses of the department will be helpful to improve cattle meat value chain in administrative & financial management, marketing and information system, digitalization of livestock services, food safety compliance, meat technology, agri- processing and animal health for the cattle value chain. Similarly, the extension literature developed by the department exist regarding feed and water requirement of animal, animal health, live weight estimation, slaughtering, diseases diagnosis, vaccination program, small and subsistent fattening, save the calf, however this literature is old and needs updated as per modern requirement. In addition, the literature on cattle meat value is limited so helping in developing and publishing the literature will helpful for increasing awareness. Additionally, the department work with Sarhad Rural support program, National rural support program, Farmer Association, World Food Program, Association of Bio-risk Management (ABM), one health unit and vet clinics so engaging these department for training will also be helpful for the dissemination of

the food safety compliance practices. Among all, the major constraints for cattle value chain is lack of technical knowledge on meat value chain, inadequate budget for field operations, lack of transport facilities for field staff as well as lack of incentives for field staff activities.

## **2.5 Institutional assessment of KP Food Safety and Halaal Food Authority**

### **2.5.1 Mandate of the Authority**

KP Food Safety and Halal Food Authority (KPFSHFA) is a newly established organization with mandate for food safety implementation and compliance of food products in the province. The authority act passed in 2014 although established in 2018 with mandate for inspection, standard setting & enforcement, testing and capacity building of the stakeholders.

### **2.5.2 Organizational structure**

The authority is headed by the Director General with total staff 200 including 39 technical staff such as deputy director (DD), Food Safety Officers (FSO) and Assistant Food Safety Officers (AFSO) with detail organogram of authority (Figure 10). The authority has 5 female staff with 2 assistant directors that play role in scientific and decision-making process. As people in KP have respect for women so entry to food premises is easy by the female officers however, female staff face working difficulty in hard areas and authority has quota for FSO and ADO in hiring. The authority still not has presence in whole KP and Kohistan is among area of selected districts of the project in which authority is not present yet. However, they have announced new staff hiring (60 FSO and 18 Assistant directors) that will helpful to meet authority framework in the rest of the KP districts. At the moment, the authority does not have a mid-term strategy in place according to them.

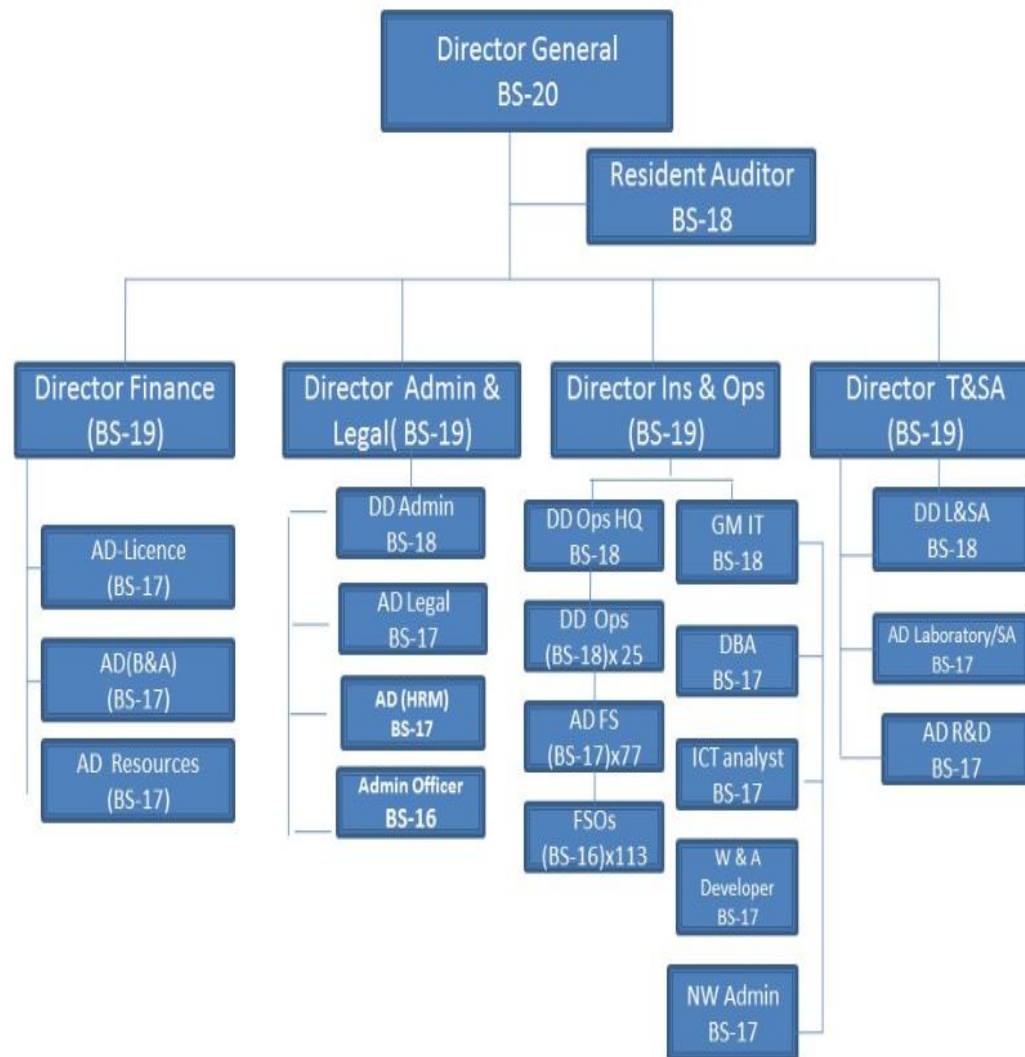


Figure 6 **Organogram of KPFSHFA**



### 2.5.3 Current food control practices and capacities at KPFSHFA

The working direction of the authority are mostly decided by local and provisional governments thus authority need planning for long term goal with scientific background for food safety implementation and improvement in province. The authority do not have risk-based inspection program and mostly they visit facility and check for adulteration, safety and hygiene by visual inspection and some limited testing and in follow up they seek improvement. They mostly use inspection method, raid or visits of food processing premises, shops, bazar and slaughterhouses and ask for safety and hygiene compliance at zero visit and in follow-up, they impose fine if food safety compliance not improved from first visit. Although if serious food safety risk exists then they apply strict action and these decisions are mainly on subjective assessment methods and on-spot decisions for product acceptance or rejection made and this approach need to be linked with scientific and with analytical analysis. They mostly discard the confiscated goods that are recovered in the raid or visit. They drain the liquid material like liquid or milk in the drains, solids incinerate and some of the material go in to waste management by the authority. They do not have standard SOP for the confiscated goods to dump or incinerate or even drain the liquid waste. They mostly receive complaints of food adulterations from PM portal and authority toll free number (0092-919212959). Overall governance model of authority indicates field staff is most powerful in decision-making (around >90% decisions are made by them) whereas, 2% of decisions made by DG and expert advisory committee.

The authority has regulations namely KP Food Safety and Halal Food Regulation, 2018 for majority food products and premises whereas, they also have established standard operation procedure (SOP) for inspections of the food production and processing premises. However, the regulations and inspection SOPs need substantial improvements for food safety and halal compliance. Similarly, the KP Food Safety and Halal Food authority has scientific panel including the members from technical field with Food Science and Technology background that has a routine meeting once in a year or on emergency plan if needed. The authority personnel including food safety officers and Assistant food Safety officers also collect food samples that is also sent to Pakistan Council for Scientific and Industrial Research (PCSIR) labs in Peshawar for analysis. The authority has program-planning unit with a mandatory monthly meeting to decide future activities as well as the performance of field staff. Mostly provisional ministers give them directions to perform their future activities and is most useful meeting and top performers are also awarded cash prizes and certificates in this meeting. They seldom engage stakeholders in program planning meeting for activities or tasks and mostly authority employees attended these meeting. So strengthening program planning unit for developing 5 year food safety vision is needed for better food safety compliance in the province.

They do not have legislation for inspection of live animals as this is done by local government and the Livestock and Dairy Development Department and also they do not responsible for standard setting and assessing live animal health. However, fresh meat and meat products is the domain of authority but no SOP's for inspection of meat and meat products were provided as an evidence for this assessment. They do not have any food safety legislation for meat and lack training material for butchers for meat butchery operations and food safety. They lack testing equipment and mostly use thermometer for temperature monitoring in meat so this need to be strengthened. They share responsibility with district government, livestock department, health department (sanitary inspection) and local administration for cattle meat value chain as well as occasionally

coordinate with Agriculture and Livestock and Dairy Development Department. Harmonization is direly needed for mandate evaluation and inspection of cattle meat with livestock and local department. KPFSHFA also works with Chamber of Commerce, SMEDA and few entrepreneurs (around 20) for developing meat value chain. So supporting authority in infrastructure especially mobile labs and testing facilities, technical field's including training in food safety compliance, value addition and meat technology as well as piloting the meat model shop and processing facility will help in the cattle value chain development.

## 2.6 SWOT analysis of value chain

The strength, weakness, opportunities and threats (SWOT) analysis of cattle meat value chain for selected districts in KP province is as below

### Strengths

- Ideal geostrategic location for export markets as well as local high-end markets
- Demand for Pakistani meat due to high-demand from Middle Eastern countries
- Halal meat availability to capture neighboring Muslims countries demand
- Availability of cheap labor for animal raising compared to meat exporting countries
- Huge animal population for both dairy and fattening
- Climate and other input expenses reasonably favorable for farming

### Weakness

- Subsistence farming creates low productivity
- Lack of meat breeds as mostly farmer raised animals for milk
- Lack of trained human resource in food safety compliance
- Lack of certification services
- Meatless days especially for exporters
- Lack of specific developed local animal breeds that can compete with western breeds
- Insufficient feedlot fattening farms in country
- Exploitation of farmers especially in festive season
- Higher animal prices and fluctuation in animal prices
- No meat grading system of Pakistan
- Inaccessibility to high end markets nationally and internationally due to poor hygienic and weak food safety practices
- Higher cost of electricity for slaughterhouses and overall industrial development in meat value chain
- Poor food safety practices, quality assurance and meat traceability
- Low level of red meat processing
- Average size of animals being slaughtered is less than 120kg carcass, which makes boneless unprofitable
- Average carcass should be beyond 200kg for sustainable & cost-effective meat to bone ratio but mostly meat exported is around 100-120kg carcass
- Export of whole carcass rather than value added meat cuts and products
- Lack of testing and analysis capacity for meat value chain

### Opportunities

- Pakistani meat loving nation especially beef

- Geostrategic location of the country as surrounded by almost half of world's population
- Muslim country so can capture halal market as a brand
- CPEC provides an opportunity to target the world's largest importer of Meat
- Gwadar and Karachi ports to expedite export of frozen meat market
- Skilled human resource especially in the domain of meat science and Food Science and Technology as well as food safety is available
- Local meat brands can be established like poultry meat and meat products
- Trade agreements with China and Qatar can create a demand

#### **Threats/challenges**

- Low level of food safety compliance
- India is among largest exporter of boneless/value added red meat products in our neighborhood
- Incompetency to comply with current international market demand
- Lack of disease-free zone that may be a problem in future for market of red meat
- Exploitation by different government department to businessmen in meat exports
- Lesser engagement of women in the decision making process of cattle value chain
- Low level of involvement of the Young community in the cattle value chain

## **2.7 Enabling environment**

### **2.7.1 Relevant regulatory bodies inspection capacity**

The Ministry of National Food Security & Research working with a vision of food secure Pakistan, responsible for policy formulation, economic coordination and planning with regard to food and agriculture. They also work to ensure modern and efficient food production & distribution system that can best contribute towards food security and nutrition in Pakistan through procurement of food grains, fertilizer, import price stabilization of agriculture produce, international liaison and economic studies for framing agricultural policies. Under the ministry, Livestock Wing is working to provide Animal Quarantine facilities in Pakistan, Import and export of veterinary drugs including vaccines and animal feed additives, Livestock, poultry and livestock products and grading of agricultural commodities other than food grains for export. The Wing also focused on private sector led development of livestock and moving from subsistence to market-oriented and commercial farming covering entire value chain with continued regulatory measures including import of high yielding animals, semen and embryos for crossbreeding; duty free import of veterinary, dairy and livestock machinery / equipment, allowing import of feed inputs, vaccines at zero rates etc. to encourage establishment of value added industry in country and control of transboundary livestock diseases. Also, the Livestock and Dairy Development Board (LDDDB) promote, facilitate and coordinate livestock, poultry and dairy development, marketing of livestock & livestock products, facilitate capacity building of stakeholders, promote and disseminate improved technologies whereas, the National Veterinary Laboratory (NVL) is institution for service and regulatory support to national livestock wealth with a mission to promote productivity and profitability of livestock in Pakistan. Furthermore, Animal Quarantine Department is working to regulate import, export and quarantine of animals and animal products to prevent introduction or spread of exotic diseases, maintain quarantine services of high standards and provides certifications services to exporters and importers.



The cattle value chain in KP regulated by government organizations like KP Livestock and Dairy Development Department, KP Food Safety and Halaal Food Authority and local district government. The district government mainly responsible for controlling rate of slaughtering animals and inspecting butchery shops for price control of meat. The livestock and dairy development department responsible for checking animal health, provide services for animals at farm and in animal mandi regarding animal health and ante mortem and postmortem of animals and meat carcass at slaughterhouses. They have presence at 4 selected including Peshawar, D.I. Khan, Abbottabad and Kohistan, provide services to the cattle meat animals. There are 2 government owned slaughterhouse in Peshawar, 3 in Abbottabad, 3 in D.I Khan whereas, no slaughterhouse present in Kohistan and in every slaughterhouse, 1 veterinary office there for animal monitoring. Similarly, the food authority responsible for inspection, standard development, enforcement and testing facility of butchery shops, slaughterhouses, meat stores & hypermarkets, meat processing facilities and food service sectors in the province. They mainly check butchery shops and other facilities for food safety compliance and hygiene however, coordination between the said departments is weak and harmonization is needed for meat supply chain between livestock and dairy development department and food safety authority for mandate to safety improvement of cattle value chain.

The laboratory testing facilities for checking adulteration and safety compliance lack in KP province with public as well as private organization. The authority have thermometer for checking temperature of animals and lack adulteration and safety aspects analysis of cattle meat. Similarly, livestock department have testing facilities for monitoring animal's health and are developing meat testing laboratory in Peshawar. For testing Peshawar Laboratories Complex of Pakistan Council of Scientific and Industrial Research (PCSIR) exist established in 1955 as North Regional Laboratories with a view to investigate raw material resources of region and assist in the industrial development of the country.

### **2.7.2 Applicable laws, regulations and policies at provincial and federal level**

Livestock and dairy development department, local government and food safety and halal food authority are major organizations that can be engaged for cattle value chain development in KP province. They have provisional and federal regulations applied in the value chain. The livestock department implement, The Animals Slaughter Control Act 2016, the prevention of cruelty of animal's act 1890 whereas, KP agricultural and livestock produce markets act is passed and will be implemented in future in meat supply chain. However, Animals Feed Stuff and Compound Feed Act and KP livestock breeding act are approval process for implementation. The Slaughtering Act, which is clearly outdated does not cater modern slaughtering and processing needs and also do not comply international best practices etc. and must be updated considering modern meat supply chain needs for safety compliance. Recently Livestock and Dairy Development Department has developed livestock policy 2018 with focus on 5 years agenda for livestock development in the KP province. Similarly, KP Food Safety and Halaal Food Authority act approved in 2014, developing legislation for meat and meat products. They have also developed They have also developed KP Food Safety and Halaal Food Authority regulations 2018 that mainly include the terms related to food processing and business operations, applicability of KPFSHA standards, food license types & procedure for licencing, halal food compliance requirement, criteria for halal foods, standard

operation procedure for animals slaughtering, conditions of abattoir, health & workers training as well as preparation, processing, packaging, transportation and storage of foods. However, these regulations need a lot of improvement as they mainly lack the scientific requirements with optimum explanation and rules, legislation & policy development along with standard operating procedure are very weak. Therefore, livestock department and authority need a lot of work for the development of legislations, regulations and policy papers for the improvement of these regulations along with all other legal documents.

The authority especially lack any expertise for these regulations and SOPs development and these legislation development will be a major benchmark to improve cattle value chain in KP. Also, the export of meat and slaughterhouse establishment is regulated by ministry of national food security and research under Animal Quarantine Department of Ministry of livestock that is also responsible for monitoring food security aspects in the country. Pakistan currently lacks meat export policy so developing a uniform meat export facility is needed to improve meat exports especially the meat value added parts and products be encouraged for value chain development. Live animal export, which is currently banned, is only allowed after getting a no objection certification (NOC) from the Ministry of National Food Security and Research, Government of Pakistan. For this, the animals pass through quarantine processes by passing a test where animals are completely examined for any disease before exporting to other countries. The livestock import is subject to satisfying animal health needs of the Quarantine Department of importing or exporting countries. The exporting country submit specimen health certificate to Ministry of National Food Security and Research for vetting before commencing export whereas, Animal Contagious Diseases Act 1948 monitors livestock health. The Livestock conservation is regulated by conservation (restriction on slaughter) of helpful Animals Act, 1956 whereas livestock breeding is being regulated by livestock breeding schemes, 1960.

### **2.7.3 Existing physical infrastructure**

#### **3.7.3.1. Road infrastructure**

Peshawar is one of oldest and of major city of KP province, hub for major commercial and business activities particularly for cattle meat export. Majority slaughterhouse involved in meat export to Afghanistan are located in Peshawar that bring live animals from Punjab as well as use local animals. The Peshawar city is connected with Torkham (approx. 55Km) via N-5 National Highway that further leads to Kabul through Jalalabad using Highway 7. The Peshawar connected with Islamabad through (M1) motorway. The Abbottabad city of KP connected through Islamabad/Peshawar motorway (M1) with Torkham (approximately 256.8Km) whereas, from Kalabagh Nathia Gali road (345 Km approx.). Also, the Abbottabad is connected with Islamabad through Hazara expressway (E35) and Islamabad Motorway (M1) for approximately 135 Km. Meat from Abbottabad is not exported to Afghanistan due to larger road distance as well as roads via Kalabagh not good that result meat spoilage and increase overall logistics cost that is not economically viable.

Dera Ismail Khan (D.I. Khan) is city of Khyber Pakhtunkhwa province situated on bank of Indus River and connected via Mianwali through Chashma and Bhakkar in Punjab. In addition, city is connected through Hakla–Dera Ismail Khan Motorway. Similarly, the Kohistan is KP district geographically stretches its border with Kashmir and Gilgit-Baltistan in east and north whereas, Swat and Shangla in west, and Mansehra and Battagram District in south. The city connected with

Abbottabad and Islamabad via N<sub>35</sub> through 235Km and 425Km, respectively. The road connectivity is not good for Kohistan that is one of major reasons for not having any commercial activity for cattle meat chain and the produce is locally consumed.

The meat carcass is packed at slaughterhouse in polythene bags and wrapped in cotton cloth followed by shifting in cold chain container that transport meat to Afghanistan. The connectivity of the motorway road to Afghanistan and china can reduce the transportation time as well as unnecessary checks from border control and police as well as low quality packaging material result in loss of meat quality and sometime rejection by export countries. The introduction of quality packaging material and packaging technologies can also improve existing shelf life of meat carcass and meat products.

### **3.7.3.2. Storage facilities**

Cold storage gained vital significance in preservation of perishable foods and fresh meat needs refrigeration (1-4 °C) whereas, frozen meat and meat products require (-18 °C) for storage. Fresh meat and meat products are among the food categories that require refrigeration soon after slaughtering of the meat animals. However, due to non-availability of cold storage facilities in slaughterhouses, the cattle meat carcass parts transported in vans/rickshaw after slaughtering in market within 2-4 hours of slaughtering. Also, the meat at butchery shop is hanged in iron rods in majority butchery shops until it is sold that is also against food safety compliance. The fresh meat is not subjected to refrigeration and is exposed to heat, dust, contamination as well as microorganism that is breach of food safety practices. Mostly, the butchers cover meat with dirty cloth that do not meet hygienic storage requirements. Similarly, few butchery shops have refrigeration facilities but they are not cleaned as well as shops does not follow food safety practices. In addition, meat stores have refrigeration facilities as well as meat exporters have cold chain facility for storage but still stores using same slaughterhouse facility for animal slaughtering and then transport carcass to stores in same vans that damage product safety and quality. These facilities are mostly not certified whereas storage facilities at export slaughterhouse used for carcass storage but freezer at butchery shops also have other food items like water, fruits *etc.* that causes cross contamination of meat.

The presence of cold storage facility like refrigerator and freezer necessary safety improvement of fresh meat however, these facilities are expensive and electricity charges are one of the major input cost to the butchers. The presence of cold supply chain not only provide safe and hygienic facilities for storage as well as improve hygienic design of butchery shops. These practices are likely to increase labor, cost efficiency, and extend shelf life of meat. To maintain quality of animal carcass and meat it is critical to establish an integrated and cost-efficient cool chain facility for slaughterhouses and butchery shops. Therefore, in short term, it is recommended to set up facilities such as freezers *etc.* for piloting at butchery shops whereas central cold storage at slaughterhouses. Whereas in the long-term, setting up small to medium scale commercial chilling and freezing units close to slaughterhouse and investing in cool chains such as cold trucks/vans for transporting meat to improve compliance of food safety is recommended.



Figure 7 Storage chiller at the display center in a meat store3.7.3.3. Processing / manufacturing facilities

The meat processing facilities in selected districts of KP are mainly based in Peshawar and owned by private enterprises as well as slaughterhouses, meat stores are also seen growth in metropolitan areas in Peshawar. The major meat processing companies and meat exporters are as below

Table 5 Meat processing and slaughterhouse facilities owned by private sector in the province

No	Name	Type of product	Location	Total workers including male and female	Level of compliance/certification	Analysis outcome
01	Euro Food	Frozen foods, Meat products like patties, sausages, cold cuts and Horeca	Peshawar		Halal certified HACCP certified Cleared by quarantine Registered by Ministry of Agriculture and Livestock	One of the renowned company for developing good quality meat based product
02	Farmers Food	Meat products like kabab, patties, sausages	Peshawar		Small company	Small company and is making progress in the market

03	Continental Meat and meat products	Fresh meat, meat products like kabab and patties	Peshawar			New company and have few products like sausages and kabab however, they are adding new products in markets
04	Munir and Co Meat Company	Fresh meat carcass	Peshawar	10-15 workers and all are male	Registered with Animal Quarantine Department, Ministry of National Food Security and Research	One of the largest exporter of meat to Afghanistan
05	Hamza Halal Food	Fresh meat carcass	Saddar Carpet Khyber Bazar Peshawar	14-15 employees and all are male	Registered with Animal Quarantine Department, Ministry of National Food Security and Research	One of the largest exporter and meat exported to Afghanistan, Qatar and UAE

#### 2.7.4 Agricultural extension service providers

Livestock is one of basic resources for earning livelihood of farmers in KP which are small land holders (approx. 4 kanal) and keep livestock to ensure domestic food security and earn cash income. The Livestock and Dairy Development Department (L&DD) extension involved in providing extension services for animal health and disease control surveillance, veterinary education, research, extension and human resource development. The L&DD is functioning in province through network of 2000 technical and 1000 administrative and supporting staff. Presently, Human Resource Development (HRD) activities vested AHITI (Animal Husbandry In-service Training Institute) Peshawar within its limited resources.





Figure 8 AHITI's designated room for butcher training

The L&DD department is managing 116 veterinary hospitals, 527 veterinary dispensaries, 347 veterinary centers, 42 mobile veterinary clinic, 01 disease investigation lab, 16 basic veterinary diagnostic labs, 05 breeding farms, 348 artificial insemination center and 1 training institute namely Animal husbandry in service training institute (AHITI). The disease investigation lab is providing the testing facilities for animal's health including monitoring health, disease diagnosis whereas, basic veterinary diagnostic labs provide services for temperature control, disease diagnosis and medicine. The department mainly provides extension services however, improper or limited animal management services affects productivity and marketability of animal. These testing facilities available are for animal health side and strengthening for better animal health management to increase the production of the animal however, they lack analysis and testing facilities for cattle meat adulteration and quality aspects.

The farmers in KP are mainly smallholders and undertake substantial effort to animal management based on their personal experience instead of formal guidance or knowledge. Consequently, to develop cattle meat value chain, there is a pressing need to provide advisory services and inputs on management, farmers training on calf fattening, *etc.* The calf fattening program is recently introduced by government through "Save the calf" project that is getting overwhelming response

from farmers and current capacity of extension services do not match quantum of need thus training and developing literature to support these activities is needed.

Currently, extension services used in production practices in cattle value chain are based on outdated information and knowledge. At present, there is virtually no in-service training program for staff of (L&DD) and KPFSHFA in animal production, animal slaughtering, compliance of butchery operations, value addition, legislation and inspection and testing of value chain. Currently no analysis lab exists in any government organization for testing quality and safety aspects of meat. To improve this situation, it is highly recommended that the extension capacity of the (L&DD) and (KPFSHFA) personnel developed through mentoring programs, hands on training workshops, refresher courses and exchange visits to other hot spots recommended.

## 2.7.5 Education system in the province

### 3.7.5.1. Existing programs required for the value chain

Food safety knowledge is important source of information for compliance of safety protocols as well as implementation of safety and quality practices in food production and processing industries. Similarly, food science and technology knowledge help to adopt preservation technologies that can be used to increase shelf life of cattle meat and meat products. Various educational institutions in KP province are offering degree programs in food science and technology, doctor of veterinary medicine and agricultural economics that are directly linked to meat production, processing, value addition and safety compliance regime. It has been observed that majority universities offering degree in food science however, none of university is offering any degree program at the undergraduate or postgraduate level in food safety and control that is already present in some institutions of Punjab and Sindh. The University of Agriculture Peshawar is the major university in the province, which have faculties in Nutritional Sciences and faculty of Animal Husbandry and Veterinary Sciences, producing trained human resource for meat value chain. The Faculty of Animal Husbandry and Veterinary Sciences has zoonotic Information Resource Center & Zoonotic Research Diagnostic Laboratory established with collaboration of Relief International to investigate and design strategies for effective control of emerging zoonotic diseases. Similarly, the department of the Food Science and Technology at University of Agriculture Peshawar has 3 major laboratories and one processing hall for practical's & research work, well equipped with latest processing equipment's, apparatus and utensils (for physical, chemical, sensory, microbial analysis, processing of fruits & vegetables, meat and poultry etc.). The detail of universities along with different program offering in food science and technology, Doctor of Veterinary Medicine and Agri-Economics in the provinces is summarized (Table 8).

Table 6 Universities offering degree program in food science and technology, Doctor of Veterinary Medicine and Agri-Economics for cattle value chain

No	Name of institution	Degree program offered	Location
1	Gomal University	Food Science and Technology	Dera Ismail Khan
2	Gomal college of Veterinary Sciences	Doctor of Veterinary Medicine	Dera Ismail Khan
3	The University of Haripur	Food Science and Technology	Haripur

4	University of Peshawar	Food Science	Peshawar
5	The University of agriculture Peshawar	Doctor of Veterinary Medicine	Peshawar
6	The University of agriculture Peshawar	Food Science and Technology	Peshawar
7	The University of agriculture Peshawar	Agri-Economics	Peshawar
8	University of Swabi	Agriculture Food Science and Technology	Swabi
9	Abdul Wali Khan University Mardan	Agriculture	Mardan

### 3.7.5.2. Relationship between private sector and universities

The public and private organization collaboration is one of key models in the success of the supply chains in the modern world. Generally, the universities conducting research for documenting food safety issues related to zoonotic and food preservation aspects and various published literature document the food safety issues in the province. In this context, Kohat University of Science and Technology conducted study for assessment of toxoplasmosis and its possible risk factors in pregnant women in Khyber Pakhtunkhwa province. They collected 733 blood samples randomly from antenatal/maternity centers and results indicated that 41% of studied population has toxoplasmosis. The major reason for toxoplasmosis attributed was consumption of undercooked meat whereas, 45.22% attributed the presence of infection. This clearly indicate the level of food safety compliance for the cattle meat value chain that is contributing the food borne illness in the consumers that is one of the major reasons of the poor health of people (Majid et al., 2016).

Also, another study on microbiological Safety and Antibigram Analysis of food products collected from Peshawar and Mardan market indicted that 23.46% samples found positive for various types of bacterial and fungal pathogens. The major bacteria in these samples were *Staphylococcus aureus*, *Bacillus spp.*, *Clostridium spp.*, *Staphylococcus saprophytic*, *Listeria spp.*, *Enterobacter spp.*, and *Citrobacter spp.* that are among the major contributors of food safety risk (Hayat et al., 2019). These published research from KP indicate grievied situation for food safety and meat and meat products are major products where food safety compliance level is poor due to less developed food supply chain. Thus, there is a need for collaborative effort between private institution especially in domain of food safety compliance cattle meat value chain and universities for research based scientific solution to improve safety compliance of meat and meat products. Even though officials in the Livestock and Diary Development Department are aware of these challenges, this was not translated to the actual actions.

### 3.7.5.3. Relationship between public sector and universities

The public sector universities in KP are mainly involved in teaching and research at their facilities. They are also involved in the training activities and research expo for display of technologies and dissemination of scientific knowledge. Most universities offer a training program as a part of the degree curriculum in animal health, disease diagnosis and food processing & preservation. Food safety is not the major part of their curriculum as well as they do not offer any trainings in the



food safety management systems and food safety compliance along with lack of food safety trainings for the different stakeholders. There is a dire need of food safety trainings for stakeholders involved in the cattle value chain in KP.

### 2.7.6 Access to technology

The butchers and farmers use equipment's for handling, slaughtering, butchery operations and meat storage are mainly provided by local shops in Rati bazar, Peshawar. Mostly shops of cutting equipment like knife, cutters and local slicers available in these shops whereas, majority food processing equipment's and agriculture tools are supplied by the Punjab. The below list provides location and companies that provide supplies different food processing equipment's in Pakistan (Table 9).

Table 7 List of equipment suppliers for testing and food processing

No	Name of company	Address
01	Rays Technologies	7/I, Block F, Near Main Market, Gulberg-II, Lahore-54660, Pakistan
02	Advance Technologies	Pishtakhara Chowk, Ring Road Peshawar, Pakistan
03	Varioline Intercool Pakistan (Pvt.) Limited	3-KM Kahna Kacha Road, Kahna, Lahore, Punjab 54010, Pakistan
04	Technology International	P-29, St# 5-6, Main Talian Wala Road, Rehman a Colony 124-J.B, Marzipur Opp Suriya Majeed Hospital, Faisalabad-Pakistan.
05	Sahi Engineering	Gondlanwala Road, Gujranwala

### 2.7.7 Access to finance opportunities in the Province

The majority of cattle meat farmers in KP are involved in subsistence farming (1-4 animals) and farm management practices keep production costs to minimum. Therefore, majority producers do not require credit for production or marketing of meat animals. However, Small and Medium Enterprises Development Authority (SMEDA), Pakistan has developed feasibility studies on establishment of model meat shops, meat processing units and slaughterhouse facility for meat. Therefore, a number of farmers and meat exporters looking for financing options and there are few local financing organizations due to government owned "Save the calf" and "Calf Fattening" initiatives. In addition, SMEDA and L&DD Department are working with banks for microfinance institutions, and private and public sector banks for development and delivery of loan aimed at cattle meat animals enterprises, including production, processing and value addition. The butchers and the farmers mostly not interested in loan due to interest, cultural norms and as KP districts are war-affected areas that is why loan are mostly not recommended. Moreover, due to the political stability and rise in economic activity there are various banks looking for financing in cattle value chain stakeholders like Zarai Taraqiati Bank Ltd. (ZTBL) and National Bank of Pakistan, just mentioning two public sector banks that are financing meat exporters. On the other hand, the Bank of Khyber is doing trials of working as a co-investor with local enterprises in different businesses, including meat value chain actors especially butchery shops for future financing.

### 2.7.8 Access to resources for food manufacturing

Water is one of major process resource required for production and processing operations like animal rearing, washing, cleaning butchery shops & slaughterhouse as well as meat processing plants. The ground water resources and rain water is used for the animal production activities whereas, ground water mainly used for the cleaning and processing operations. Majority of butchery shops have water availability however, few shops do not even have access to clean water. Also, the slaughterhouse and meat export facilities have tube wells for the supply of water but the electricity cost and sometime load shedding makes problems for the water availability. Accordingly, the provision of non-stop water access is a big issue in the province and situation is more problematic in far off areas.

Likewise, electricity one of major requirements for business establishment and industrialization is expensive and majority areas are experiencing the short fall of the electricity. The electricity load shedding creates problems for stakeholders having cold supply chain and continuous support.

The meat value chain stakeholders are using plastic bags and cloth for covering meat which create food safety issue and reduce shelf life of meat. Also, the roads are not very good that also reduce the post-harvest losses during transportation of meat. Considering this, there is need for introduction of food grade packaging material along with latest packaging technologies like vacuum & modified atmosphere packaging technologies that will not only increase shelf life of fresh cattle meat but also helpful to increase food safety compliance.

### 2.7.9 Current and future impact of climate change on cattle value chain

Climate change and global warming are affecting agriculture and livestock globally whereas developing countries like Pakistan are more affected as rely on agriculture and livestock for their exports and revenue generation. The effect of climate change on agriculture and livestock are explained by energy water nexus vicious cycle in which drought leads to increased use of energy intensive water that leads to more consumption of fossil fuel and energy leading towards increased emissions leading to climate change & droughts and vice versa (Retamal *et al.*, 2009). According to German watch report<sup>3</sup>, Pakistan is 5<sup>th</sup> most vulnerable country to climate change mainly owing to its geographical location and KP province is among the most affected provinces in the past years. It is likely to report higher frequency of extreme weather events in future which can be translated to potential risks for planned project activities and sustainability. Additionally, the temperatures are expected to rise in line with global trends. Studies<sup>45</sup> for Pakistan suggested rising temperature is likely to result in melting of glaciers in western Karakorum and Himalayas which will increase the incidence related to the increased river flow. In addition, the rainfall during summer monsoon may increase up to 20-30% with additional rainfall resulting high-intensity storm. For KP these trends pose challenges and require crop varieties and livestock breeds that can better adopt in these climate changes for better production and improved management

<sup>3</sup> Eckstein D, Künzel V, Schäfer L, Winges M. Global Climate Risk Index 2020. Bonn: Germanwatch. 2019 Dec.

<sup>4</sup> Ullah W, Nihei T, Nafees M, Zaman R, Ali M. 2018. Understanding climate change vulnerability, adaptation and risk perceptions at household level in Khyber Pakhtunkhwa, Pakistan. International Journal of Climate Change Strategies and Management.

<sup>5</sup> Ali S, Liu Y, Ishaq M, Shah T, Ilyas A, Din IU. Climate change and its impact on the yield of major food crops: Evidence from Pakistan. Foods. 2017 Jun;6(6):39.

practices to conserve soil and water. Similarly, primary source for production of greenhouse effect in world include electricity/heat (31%), transportation (15%) and agriculture (11%). The agriculture and livestock account for about 39% of Pakistan's total GHG emissions in 2008 whereas, the emissions were essentially methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), 79%, and 21%, respectively, and originated mainly from enteric fermentation in cattle, rice cultivation, nitrous fertilizer degradation and management of the manure (National Climate change policy Pakistan, 2012). According to Food and Agricultural Organization (FAO) and International Livestock Research Institute, cattle is one of top contributor of greenhouse gases to climate change, accounting more than three-quarter of emissions from global livestock. However, the production practices can affect emission of greenhouse gases so it is direly need to adopt these practices for least emission of gases release and the livestock department need to make more effort to get prepared for any emergency situation with the collaboration of provisional and national disaster risk management authority.

## **2.8 Situation analysis and need assessment of value chain stakeholders**

### **2.8.1 Value chain map with standard flow of the product**

The below mentioned flow line gives an overview of various market agents along with their potential role in marketing of cattle value in the KP (Figure 12):

**Farmer:** They are the major stakeholders involved in the animal rearing and agriculture farming on land either owned by them or on rent. They sell their produce on annual or six-month basis to the animal contractors in animal mandi.

**Agents or animal contractors:** The animal contractors are the direct buyer from farmer. They facilitate the buying process on pre-agreed commission at the farmer's field; supply the animals in bulk by transporting the produce from field to collection point.

**Wholesalers:** They sell produce including animals on consignment or commission-basis and are based in the wholesale market.

**Butcher/Retailers:** They purchase meat or animals from the wholesalers in animal mandi and sell the meat to the consumers.

**Meat processors.** They are involved in the animal purchase through wholesalers or animal contractors to buy meat on large scale for meat processing that targets exports or the final consumers.

**Transporters of pre-processed products and by products.** They are engaged in the transport of the meat carcass and the processed meat based products from the slaughterhouse to the butcheru shops and processed meat products from meat processing factory to the shopping outlets.

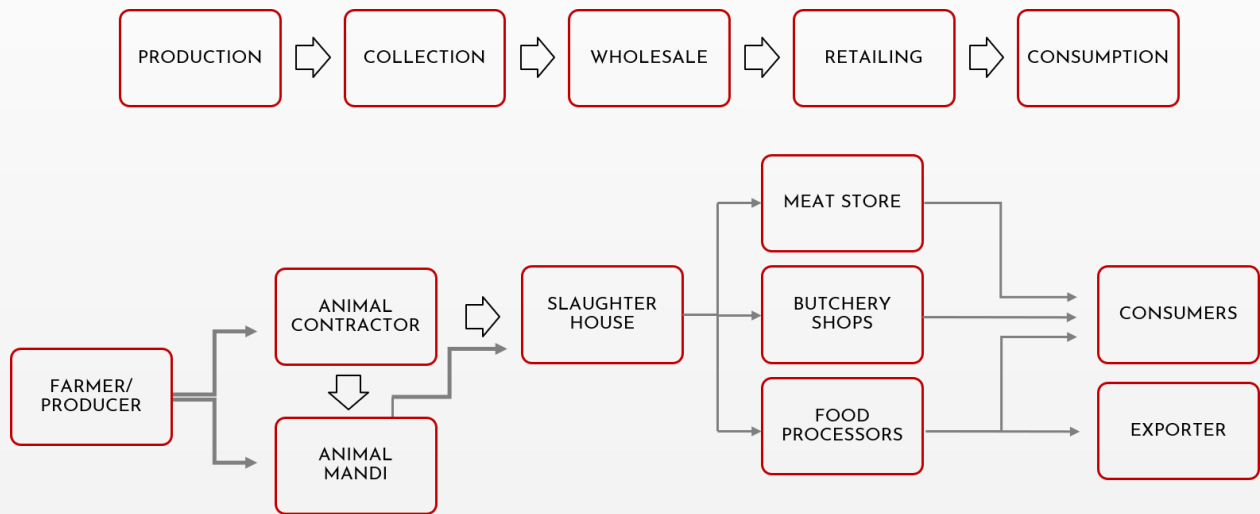


Figure 9 Stakeholders involved in the cattle meat value chain

## 2.8.2 Estimated population of meat related value chain actors in the province

Peshawar has around 2,500-3,000 butchery shops, 10-15 meat stores, meat processors (Euro Foods, farmer foods and continental foods). Similarly Abbottabad has around 1000-1200 meat shops, 3-5 meat stores, D.I Khan has 100-120 meat shops, 2-3 meat stores and Kohistan has 15-20 meat shops and no meat stores for providing meat to the consumers. The butchery shops engaged are major cattle meat supply link for the consumers are small, lack food safety compliance and need substantial improvement for food safety compliance. These shops are mostly inspected by the local government (mainly for regulating meat price), KP Food Safety and Halaal Food Authority (for food safety compliance) where they are present and in location like Kohistan, the local government is engaged to check the food safety compliance and rate of the meat. However, there has been growing trend for meat shops with installation of glass doors and refrigeration facilities that is an indication for consumers' desire to purchase hygienic and good quality safe meat. However, meat price is one of major factor in these butchery shops with Pakistani rupees (Rs.) 420-480/kg meat and meat stores (Rs. 450-550/kg) and meat stores charge higher price (approx. Rs. 100/kg is higher in meat store than butchery shops) but consumers are buying and there is a market for beef including cattle meat as the meat is preferred by consumers. Also, the meat price is comparatively higher in the Peshawar city followed by the Abbotabad, D.I. Khan and Kohistan, respectively.

## 2.8.3 Livestock farmers

### 3.8.3.1. Production and breeds of cattle

The majority farmers in KPK are small (>90%) with average land holding of 4 kanal in Peshawar having 1-2 cattle for milk and meat. The farmer's rears cow, buffalo and lamb for milk and meat in the province however; beef is the preferred meat for locals clearly indicating the significance of the cattle meat animals. Also, 10% farmers are having 20-50 herds as small farms animals and

mainly they keep Nili Ravi, Azakheli for buffalo and Sahiwal as well as cross-bred of Sahiwal with Holstein Friesians are kept by the large commercial farmers. With the increasing demand of milk and meat in the cities of the province like Peshawar and Abbottabad the trend for developing commercial farming is increasing. The major feed sources like fodder/grass, wheat straw that is major feed source, sugarcane, silage, choker and commercial feed *etc.* are available in KP however, they are costly and aflatoxin contamination also on present in the feed that can decrease the productivity and safety concerns for the cattle. The feed inputs are mostly coming from Punjab and laborer for managing the commercial farm is also belong to Punjab.

Considering production cost of cattle for meat, they take average 2-3 years with major expenses for feed sources. The calves are available for fattening farms but they are available and their health and management expenses are high that is one of the challenges for the development of meat value chain. The animal health and diagnosis facilities are provided by the livestock department however, the extension services need to be strengthened to control the disease attack in animals. In addition, there are no separate breeds for the meat animals and the culled animals are used for the meat purposes and the same price for culled and fattened animal is one of the big challenges for developing commercial fattening farms in the province.

Around 20-50 progressive cattle farmers are present in Peshawar whereas, Mardan has more than 120 progressive farmers that are rearing calves for meat value chain. The farming community in the province get technical support from L&DD Department in monitoring animal health, disease surveillance and disease diagnosis. However, the farmers lack skills and training on fattening, animal marketing, value addition and product development. Recently, the meat and milk development projects linkages in which emphasis is on meat value chain that is also encouraging farmers to invest in rearing calf for meat but they are worried that they will not get any cost premium for the fattened animal meat and culled animals as no differentiation system occur for these different animals meat. So developing and segregating animals on the basis of quality can help farmers for the development of the cattle value chain and this will also encourage private sector to come that will create sustainability in the meat value chain.

### **3.8.3.2. Marketing of livestock**

Considering marketing including sale & purchase activities of cattle which are mainly performed by men include purchase of animals and feed inputs, rate of cattle is one of core issues as cost of animal, feed inputs and labor is high and is continuously increasing. There are few examples in Islamabad and Lahore where animals' sale is done on live weight basis at 212-220 per kg of animal live weight. However, animals in KP sold to contractors and in animal *mandi* or market. The animals reared for meat purpose are mostly sold at the age of one year on physical appearance basis so when they are fed on grass in pastures, the animals is lean resulting lower price for the animals. Therefore, mostly farmers fed them green grass, feed ingredients/rations, salt and sugar few days before sale to fetch good price of the meat animal. The overall price of meat animals remains same but escalate especially in Ramzan and in summer. Also, the majority animals in market are sold by farmers piece-by-piece and no marketing groups or cluster is in place. This is also one of the major issues for not getting the good price by the farmers for animals

For animal handling and management of 50 animals, 3 persons with average Rs. 20,000/month required who can even manage 300 animals for feeding, cleaning and other indoor farm activities

so these small farms are not cost effective rather there is need to broaden the farm level as well as introduction of some mechanization and use of technology. Also, majority labor engaged in these farms belong to Punjab as locals lack the skills and training to run more industrialized farming activities. Some also receive loans for establishing different animal farms, for instance to produce milk, which are provided by Bank al-Habib and Bank of Khyber. The representatives of the above mentioned banks are also looking for options in collaboration with livestock department for loan feasibility to cattle meat farmers for establishing commercial farms. They are willing to provide loan on commercial interest rate but generally the turnover is low as well as loan is not preferred by the peoples. The major challenge in the loan provision are local norms as well as longer time for recovery of the loan and less probability of loan compared to milk farm where loan recovery starts with lactation of animals. Considering farmers interest and banks engagement, several financial sources will be available for financing cattle meat value chain in KP however, banks want to fund loans on commercial interest rate which is difficult to pay by the small animals farmers. The trainings regarding animal health and farm establishment by L&DD Department in collaboration with FAO etc. are provided to farmers through the project “Save the calf” funded by the government of Pakistan. Although, this project will be able to support and train a small number of farmers so there is need to train the farmers in this domain.

#### **2.8.4 Associations role in cattle value chain**

Currently two associations namely Butchers Association and Livestock Farmers Welfare Association are working in the Peshawar city for the development of the meat value chain. The Butchers Association is the association established 25 years ago headed by president and its first president election held around 18 years ago. The association has more than 2500 shops in which 2000 shops are small whereas approximately 200-500 are large. In Peshawar city, mostly animals are slaughtered in slaughterhouse whereas, in villages open street slaughtering also practiced. Mostly the slaughterers gather in slaughterhouse and raise voice for the rights of butchers. They do not have any database for butchers and mostly they do not have any documented method for coordination. Mostly using phone calls for coordination and conveying of the information. Similarly, the Livestock Farmers Welfare Association Khyber Pakhtunkhwa is the second association working for the betterment of the farmers. They also do not have databank of the farmers however, they claim that small farmers in Peshawar mostly (90%) are small-holders with average land holding of 4 kanal, sufficient for having 1-2 cattle for milk and meat purposes whereas around 10% farmers are large having the animals around 20-50 herds and in Peshawar. Livestock Farmers' Welfare Association, Khyber Pakhtunkhwa and Land Mark Communications has recently signed (MoU) for organizing Dairy & Livestock Expo 2020 in Peshawar that will also improve of cattle meat value chain and livestock sector in KP.

##### **3.8.4.1. Butchers Association**

The Butcher's Association established in 1995 in Peshawar (25 years ago) and president election were conducted around 18 years ago indicating weak set up of butcher's association and lack of interest for the association. The president of the association reported more than 2500 butchery shops in Peshawar with 2000 small and -200-500 large meat shops. They do not have exact estimate for butchery shops as the shops in periphery of the city areas are mostly not



documented. The slaughtering is performed in slaughterhouse in the cities of the Peshawar, Abbottabad and D.I. Khan whereas Kohistan open slaughtering is practiced whereas in villages open street slaughtering is still practiced. The animals in slaughterhouse come are mostly not passed through a strict check for ante-post mortem testing however, it lacks any check in open street slaughtering. Approximately 1000 animals slaughtered on daily basis in the Peshawar slaughterhouses where ante-postmortem control is made by the livestock department whereas, Food Safety and Halal Food Authority are checking butchery shops for food safety compliance.

Considering animal procurement for slaughtering by butchers, they purchase animals from farmers, animal mandi and contractor on physical appearance basis. The purchase is on cash and there is no issue for animal availability however, meat is expensive in summer and in Ramzan as well as animal prices has increased considerably in last 2-3 years due to higher meat demand and fuel prices for transport of the animals. Regarding butchery shops services, the L&DD Department provides animal health & disease diagnosis, inspection at slaughterhouse, dispensary for animal medicine especially during Eid-ul-Azha and information regarding slaughtering act/law etc. The slaughter mostly learns slaughtering operation and meat cutting skills from their ancestors and in general they lack knowledge on food safety compliance. They have never been trained on food safety practices including food handling that is one of the major issues for low level of food safety compliance in the province. They also demanded higher rate for butchers/Kasab (which is around Rs. 100-150 per animal for slaughtering and deskinning). Meat price based on categorization, animal prices are high and increasing days by day. There are waste disposal mechanism in place to protect kasab's health and control of district coordination officer (DCO), police, local government and food safety and halal authority for maintaining their operations.



Figure 10 Entrance of the major animal mandi and slaughterhouse in Peshawar

Tabla 8 Price of fresh cattle meat at butchery shops, meat stores and export market

Local government rate for fresh meat	Fresh meat with bone retail price at butchery	Fresh meat with bone price at meat	Export market rate of fresh meat for

with bone	shops	stores	Afghanistan
Rs. 440/kg	Rs. 440-480/kg	Rs. 450-550/kg	\$ 3.50-4.5/kg of meat

### 2.8.5 Meat exporters

Meat exporters' slaughterhouse facilities are mainly present in Peshawar city of the KP province and all the animals from KP and Punjab are brought to these facilities. Afterwards the meat carcass is exported to the different countries mainly Afghanistan, Qatar and Dubai etc. The meat exporters interviewed for completion of these surveys were Munir and Co Meat Company and Hamza Halal Food. The Munir and Co Meat company is the largest and oldest facility located in 130 kanal area including place for animals mandi, slaughterhouse and lairage established in 2003, having 50 fixed employees whereas thousands visit facility regularly on monthly basis. They are having local slaughterhouse and export meat slaughterhouse facility in the same location although not merged and separated by animal mandi. They charge Rs.50 per animal for slaughtering at local slaughterhouse. The animals from all over Pakistan come to this facility for sale and from KP good animals come from Peshawar, Swat, Dir, Charsada and Parachinar through middleman/ beopari. Farmers also bring animals for sale although the major animals are brought by the middle man. Approximately, 15-20 thousand animals with average age 1-2 years come to this mandi on monthly basis and facility is open 24 hours a day. They have a capacity for more than 20,000 animals and have storage facility for the meat exported to the other countries. The slaughterhouse for export is comparatively better but still the food safety compliance is not achieved by these slaughterhouses. They do not purchase meat animals for export rather they purchase meat @460 Pakistani rupees per kg from different suppliers and then pack in 4 quarters or whole carcass in chiller. In chiller they maintain refrigeration temperature (1-4 °C) and cover meat with packaging material including polythene shopping bag and cloth for meat to be exported to Afghanistan. Afterwards, they put meat carcass or meat parts in container and transport to Afghanistan via Torkham border which is 55 km away from Peshawar. They are maintaining chiller temperature but electricity shortage also influences the quality and safety aspects of the meat.

Although the slaughterhouse facility for export purpose is comparatively in a better shape than local slaughterhouse, they have their own challenges. The facility is actually located near to a dumping area for waste as well as are away from main roads located in low-lying area which can be in severe condition, especially in rainy days. The slaughterhouse road is not made of concrete and also the cloth used for wrapping is not of the approved quality that can also influence the meat safety. The workers are not wearing personal protective equipment's (PPE) during different slaughtering operations. The facility was never certified for food safety certification and workers especially butchers are never trained for food safety compliance. The requirements from Afghanistan are not very strict and no prior slaughterhouse visit was done by them.

The Hamza Halal food having facility approved for establishment in 2006, having capacity of 300 herds/day for animal's lairage, slaughtering, and cold storage and exporting meat to Afghanistan, Qatar and Bahrain. They are purchasing animal through contractor to meet volume of animals, quality, price and time and purchase animals on live weight basis. They are installing slaughtering

box although currently slaughtering with traditional approach having 14-15 employees with 1 veterinary doctor. They have food safety certification in past from Bureau Veritas and now looking for Halal certification in future. After getting approval from Ministry of national food security and research, they were visited by Environmental protection agency, town planning department including Urban Policy Unit, Excise and taxation department, Livestock and dairy development department, Labor department and Water and Power Development Authority (WAPDA) for this facility approval and related activities that needed to be harmonized before approval of the facility for timely completion of the slaughterhouse and start the production. The facility is modern as well as they are installing cage for animal slaughtering for meeting the export needs in future. However, butchers working here are trained from their family and do not have food safety compliance training. After animals arrived in facility, they slaughter the animals and deskin and cut in to different parts followed by placing in cold chain and then exported to Afghanistan via road and Bahrain and Qatar via air. They have cold storage facility for meat and also performing sorting and packaging of meat as Afghanistan and Qatar has some different export needs for meat. They mostly prefer whole carcass or 4 quarter whereas for Qatar, they demand carcass with approximate 120-130Kg in 4 quarter that is preferred for air travel. They are using food grade packaging material such as plastic sheet & cotton cloth that is easily available in the market. The availability of meat animal is not issue but the food safety compliance is major issue and can be managing through supply of animals through contractors can better help to achieve food safety compliance. The animals are inspected by veterinary doctor and also reject (2-5%) of the animals brought to this facility.



Figure 11. Slaughterhouse facility in Peshawar exporting meat to Afghanistan

They are exporting meat to Qatar and Afghanistan and expected to expand to Saudi Arabia, Abu Dhabi, Bahrain and Kuwait in future and they are aligning the facilities as per the norms of these countries. They are now targeting the high-end markets as cost premium are more in these markets. They are installing animal killing box, have slaughtering facility, cold storage rooms and 3 cold storage transportation vehicles with 10-20 tons capacity. They are using, salt, soda for



cleaning of transportation vans that are used for meat transport and occasionally have any issue for the meat vans.

There is dire need for policy development for export of meat and KP province is war affected area so no loan scheme recommended due to recovery issues. In addition, load shedding (>10 hrs.), one of major problems that demand backup generator to provide uninterrupted electricity supply to maintain cold chain temperature which increase overall cost of production for value chain. They have tube well for water supply but due to electricity shortfall and load shedding, they have to establish water storage which is extra on cost of production. Also, rate of export be increased as local slaughterhouse and cost of animal is increasing on regular basis that is one of the big threats for meat export in future. The price decaping from local government is also needed whereas, police, custom and road clearance issues and procurement department exploitation be reduced and their better coordination is direly needed for developing export volume. Additionally, policy development for export, legislation development and especially implementation plan like meatless days for cattle meat export.



Figure 12 Meat storage facility in slaughterhouse for export

### 2.8.6 Butchery Shops

The peoples of KP consume beef as their favorite meat and majority people (> 95%) purchase meat from butchery shops located in different cities of province. For assessment of food safety compliance, a survey developed and was completed by approaching different butchery shops of selected districts of province. The butchers working at meat shops in selected districts of the province have learned slaughtering and cutting operations of animals and carcass from their ancestors. They never been trained on humane animal handling, halal slaughtering compliance, meat cuts preparation and food safety compliance from any educational or regulatory institution yet. They bring meat after slaughtering animals from government slaughterhouse and even street slaughtering is practiced in village areas of the selected districts and especially in D.I Khan and Kohistan. The shops have 2-3 butchers and mostly sell beef along with mutton in majority and openly hanged on the iron stands in the air that is not food safety compliance and also exposed to

dust, dirt and pathogenic bacteria and is one of major reason for food borne diseases. Majority shops do not comply food safety practices however, some shops have refrigerator and glass window but mostly contamination is there as meat is mostly hanging outside directly exposed to open environment. Majority shops in city areas have access to electricity and water but few shops do not have access to water and they bring water in cooler/water tank for washing and cleaning purpose. They are not using any food preservation technologies except few who refrigeration facilities for meat storage in city areas of the province. They are inspected by district government only for price and food authority for food safety. In addition, none of the butchery shop certified by any food safety compliance company. They mostly purchase animals from mandi followed by slaughtering and then transport carcass on loader van and rickshaw that also do not meet safety compliance for meat. Considering the food safety compliance, there is need to stop the street slaughtering, train the butchers on food safety practices and compliance as well as linking the butchery shops with any kind of preservation technology through solar system for piloting and demonstration by setting a model meat shop will be helpful to improve food safety compliance.



Figure 13 Butchery meat shop in Peshawar

### 2.8.7 Meat processors

Food processing is important in value addition of cattle meat and process meat products having better shelf life and liked by the consumers. There is a rising trend for consumption of processed meat products in the world. There are very few processing plants in KP province, mainly based in Peshawar, which are engaged in value added product development. Among these, Euro food, Farmers food and continental foods are leading companies that are producing value added meat products for consumers. The Euro foods is one of leading establishments that produces local and export quality meat products, known for packaged beef, mutton, chicken and processed meat products. They are one of biggest meat processing facility in KP province located in Peshawar.

Their current product portfolio include a variety of frozen sausages, cold cuts and others meat products for consumers and food service sector in Pakistan. They have well-developed meat processing facility and produce products under hygienic conditions. They follow good manufacturing practices (GMP), certified for HALAL, Hazard analysis and critical control point (HACCP) and also endorsed by quarantine and MNFSR certifications. They have access to energy and water for processing activities in the industry despite the high costs. Overall it was indicated that workers need training for better managing the food safety and halal compliance. They have infrastructure for industrial requirement, product development and using food preservation technologies like refrigeration and freezing to preserve meat and meat products. Similarly, farmer food is newly established meat processing company that is producing value addition meat products for local consumers whereas, continental food is a very small company and has started company recently engaged in the product development of red meat products. These companies are not certified for food safety as well as compliance level is low so help them for getting certification and providing training will help them to better manage the food safety compliance and reaching high end markets for better growth and development of the value chain.

### **2.8.8 Post-harvest losses and on-farm issues**

The meat animals brought to animal mandi by farmers are purchased by commission agent/arahati/slaughterer from the farmers. After this, the animal is brought to the slaughterhouse for the slaughtering and then they are transported to the butchery shops using cooling vans. According to Gustavsson et al. (2011), the post-harvest of meat in developing countries is around 15-20 percent that is mainly due to lack of refrigeration facilities as well as lack of cold supply chain. As meat carcass is a perishable food commodity with a shorter shelf life as well as due to nutrient dense source, meat is also an ideal substrate for the growth of the microbes. The major portion of the cattle meat sold as fresh meat and the safety compliance is one of the big issues as there are no implementation of good manufacturing practices (GMP) at butchery shops. The meat processing companies like Euro Food have implemented GMP and HACCP but it represents a small portion of the cattle meat chain in KP. In addition, the local animals are fed on the pastures having good taste but it does not gain weight very quickly and mostly the shopkeepers prefer the animal from Punjab (Fahad *et al.*, 2018; Gustavsson *et al.*, 2011).

### **2.8.9 Retailers and sales**

The cattle meat animals produced in KP mainly consumed by locals and a small proportion is exported to Afghanistan and other countries. The farmers are mainly selling the animals in local animal mandi or through commission agent or slaughterer and are not connected to high-end markets like Metro, Hyper star in Islamabad etc. although, Metro Pakistan stores in Islamabad that is one of big suppliers of cattle beef in Islamabad is not getting any meat supply from KP currently due to food safety compliance despite their interest. Most of the supply for Islamabad is currently met by the different suppliers from Punjab but by improving of food safety compliance, the cattle meat farmers and butchers can be connected with high end market of Islamabad and other big cities of Pakistan.



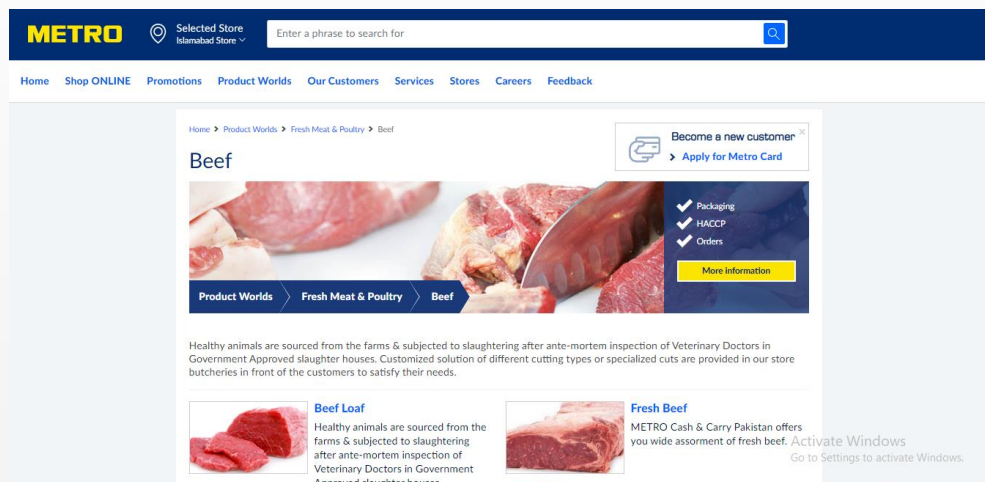


Figure 14 Metro superstore advertisement for the beef

## 2.9 Synergy of the different research projects

Livestock is one of major income sources for rural population of KP province. The different funding agencies worked or has been working in improving livestock sector, animal husbandry and rural development in KP Province include Food and Agriculture organization (FAO), European Union (EU), Swiss Agency for Development and Cooperation (SDC) and Netherlands. The FAO has been supporting pre-field activities for livestock including control of livestock infectious diseases such as foot and mouth disease (FMD) and peste des petits ruminants (PPR) in the province and their projects are still ongoing. The EU prioritizes also include strengthen livestock services in the province whereas SDC prioritizes KP and FATA, for capacity building of different workers L&DD Department through project of Livelihoods program in 5 districts of KP Province and 2 districts of FATA. The government of Netherlands established the Animal Husbandry In Service Training Institute (AHITI) in 1986 and trained female livestock assistants in the KP Province however it is no longer working at its capacity in the province. The Agency for International Development (USAID) and Department of International Development (DFID) funded NGOs in the sectors of animal husbandry and rural development in KP for improving the livestock sector as well as improving milk and meat production to meet the local demand as well as creating opportunities for the export. Similarly, numerous NGOs worked for agriculture, livestock & animal husbandry and rural development in the KP Provinces. Among these, the Sungi Development Foundation, is working in Haripur, Abbottabad and Mansehra Districts for more than 25 years implementing 22 livestock projects. Pakistani Hoslamand Khawateen Network (PHKN) also among local NGO which works for the empowerment of females through agriculture, livestock and vocational training in Haripur District of province. Also, Sarhad Rural support program (SRSP) which is a nonprofit company working in KP with aim to support approach to community empowerment, economic and livelihood development. They are closely working with L&DD Department for extension services and deworming of animals. The national rural support program, Farmer Association, World food program of United Nations, Association of bio-risk management (ABM), one health unit and small vet clinics owned by private doctors are contributing in extension services for animal health management however, fattening of animal scenario is new in the province and attracting a lot of

farmers. Recently, government of Pakistan approved several projects and the most prominent include feedlot fattening farm in Khyber Pakhtunkhwa (826.573 million for a duration of 4 years) and “save the calf program in Khyber Pakhtunkhwa (1554.019 million for a duration of 4 years) directly linked with cattle value chain in the province. The major activities of these projects include deworming & vaccination, provision of inputs and farmers awareness regarding the fattening farm that will boost meat value chain in the KP.

Considering limited organizational capacity of L&DD and KPFSHFA including lower staff, lack of skills and capacity for monitoring cattle value chain and limited budgets, the international development projects often end up playing active role in provision of services and mostly activities continue until the project is executing and all these activities wipe out upon completion of the project. Therefore, it is direly needed for the sustainability of project outcomes that can be ensured by engaging all stakeholders especially of private sector for continuity of activities after termination of project activities for the sustainability and long-term benefits. Similarly, the authority is not present in all districts of KP and extending their presence in all KP districts will be a first step to improve food safety compliance of cattle meat value chain in KP province. Also, the Government of KP has recently increasingly annual development funds aside for provision of extension services to the farmers. Examples in order are the recent support PSDP project feedlot-fattening farm in Khyber Pakhtunkhwa and save the calf program in Khyber Pakhtunkhwa. The list of major research project that were implemented or being implemented in the KP province for improving livestock and cattle meat value chain (Table 10).

Tabla 9 List of research project for improving livestock and cattle meat value chain by local and international funding agencies in the KP province

No	Project title	Amount & Funding agency	Time period	Status
01	Data Collection Survey on Agriculture Sector in Punjab and Khyber Pakhtunkhwa Provinces	Japan International Cooperation Agency	2016	Completed
02	Meat Value Chain Assessment of the Livestock Sector in Pakistan	USAID Agribusiness Project (UAP)	2012	Completed
03	Livestock development project	Asian Development Bank	August 1989 to February 1999	Completed
04	Beef value chain in Pakistan	Agricultural credit and microfinance department, state bank of Pakistan	2012	Completed
05	Use of Molecular Techniques in Livestock Research at KPK	30 Million, Government of	3 Years (2014-2017)	Completed

		Pakistan		
06	Establishment of Livestock Research & Development Station at Swabi, Khyber Pakhtunkhwa	59.510 Million, Government of Pakistan	3 Years (2014-2017)	Completed
07	Characterization of Cattle Genetic Resources of KPK Through Genetic Markers & Molecular Technologies	Government of Pakistan		Ongoing
08	Study on the Causes of Calf Mortality & Measure to reduce losses in KPK (2015-16 to 2016-17)	8 Million, Government of Pakistan	2 Years (2015-2017)	Completed
09	Multi-Year Humanitarian Program (MYHP)	USD. 6,703,725 and Department for International Development (DFID)	Five years (2015 - 2020)	Completed
10	Support in Implementing the Agriculture and Livestock Policies in Khyber Pakhtunkhwa	USD 50,000 and FAO	2019-2020	Ongoing

### 3. Opportunities for investment in cattle value chain

#### 3.1 Vision

Livestock is one of vibrant components of agriculture and is major source of livelihood in Khyber Pakhtunkhwa. Majority animals reared by farmers include local breeds of cows and buffaloes, but the rearing/farming of exotic/crossbred cows is also increasing as one of major aspects for development of the cattle value chain due to higher productivity. Majority farmers are using livestock farming as subsistence but increasing trend for establishing commercial farming practices. The government is also supporting farmers with recent approved investment in livestock sector especially project “Save & Fattening of Calf” developed under Prime Minister’s Agriculture Emergency Program with a total worth Rs. 5,344 million over 4 years’ time.

The cattle meat farming is increasing due to increasing local and export demand but compliance for food safety is very poor in the meat value chain especially at slaughterhouses and meat butchery shops. After animals rearing, majority supply chain is not regulated on scientific basis and compliance level is unsatisfactory. The investment in food safety compliance of fresh meat and meat products is needed that will reduce burden the food borne illness level for locals and will create demand for export market. In addition, red meat products available but only small chunk of fresh meat is processed and majority meat consumed as fresh and sold by butchery shops in province. The introduction of new meat products like smoked, cured and value-added products

recommended for development of processed meat along with traditional food products will encourage private sector for value addition chain.

Also, the China Pakistan Economic Corridor (CPEC), geostrategic location of KP province, increasing high-end markets and other export countries provide a large number of opportunities for food exports. However unless SPS and food safety compliance issues are not addressed by policy-makers and the industry it remains a major hurdle for the country's export potential. Similarly, the rise in tourism is also one of drivers for increased demand of cattle meat supply, which will create a further rise in the demand of the cattle meat in province. Overall, there is a dire need to increase animal productivity, improving slaughtering facilities and butchery shops food safety compliance, value addition and processing and engagement of public and private.

### 3.2 Recommendations

As per the detailed analysis of cattle value chain in selected districts of KP province, a list of narrative recommendations produced to ensure inclusive and sustainable industrialization of meat sector in the province:

- Livestock and dairy development department (L&DD) engaged in cattle meat value chain lack skills in meat testing & analysis for adulteration, value addition and processing. Therefore, L&DD staff should be trained on meat testing, value addition and product development for improving value chain.
- The food safety and halal food authority (KPFSHFA) lack skills and capacity for monitoring and analyzing food safety compliance of cattle meat and meat products so trainings authority staff for testing and inspection protocol is needed
- The authority has scientific panel without fixed meeting calendar so developing a calendar of meeting (quarterly) with people of diverse technical background is recommended
- The standard operating procedure (SOP) for inspection by the authority are weak so developing SOP with international best practices is needed
- Harmonization with in governmental department Like L&DD, KPFSHFA and Local government is needed for defining scope as per the skills and capacity of the different departments for the value chain development
- Slaughterhouse facilities in KP are in very bad condition so there is dire need for installation of tiles, wire gauze, road connectivity and conditions and development of cold storage facilities for local consumption
- The slaughterhouse facilities producing meat for export is better condition than local facilities but still they lack cutting machine, slaughtering box and mechanization so helping them in mechanization will improve the food safety compliance to target the high end markets.
- The meat processing industries and slaughterhouses lack food safety and Halal certification so training them to acquire these certification is recommended to improve food safety compliance
- The meat stores, slaughterhouse and meat units lack quality control, waste disposal and cold supply chain so technical training for developing these facilities will improve the situation

- The butchers and food processors be trained on food safety compliance practices such as good manufacturing practices (GMP), good hygiene practices (GHP) and Hazard analysis and critical control point (HACCP) analysis as per international best practices
- Introduction of trainings and degree program in food safety for capacity building and training of peoples.
- Pakistan is the 5<sup>th</sup> country in the world hit by the climate change and KP province is affected most so planning and use of technologies like solar tube well and water resource needed for water supply
- Electricity supply is not round the clock so installation of generators and solar panels is needed for maintaining cold chain temperature during storage.
- Analytical facilities especially meat adulteration, microbial load estimation and kits for differentiation of halal and non-halal meat recommended for livestock and authority
- Piloting up small meat processing facility is recommended to work as a model for private stakeholders to invest in value addition of cattle meat for sustainability of project activities.
- Rapid toolkits provision and the staff training of the relevant government departments for rapid monitoring of food safety compliance of the cattle meat value chain
- Developing mechanism to report food borne disease in the KP province to estimate the significance of food safety and its impact on human health

#### **Enabling environment**

- Collaborative approach required among different stakeholders and come up with business model that is acceptable for butchers for all value chain actors. Also, meat price decap in stores will also encourage private sector to invest for cattle meat value chain for local consumers with better food safety compliance.
- Development of performance monitoring framework for food control functions, including inspection and testing to periodically monitor and evaluate outcomes of investments undertaken in the meat sector.
- Development of food safety schemes for different actors with the possible inclusion of social and environmental practices and promote through existing agricultural extension services;
- Establishment of public-private platform to improve ownership of capacity building investments and facilitate required short and long-term actions based on existing policies;
- Revision of laws to support private investment, including foreign direct investment in the sector;
- Upgrading current food control functions, particularly testing and inspection. Current inspection practices do not follow risk-based approach. Furthermore, inspectors should follow an advisory approach to food business operators on the required changes of their facilities.
- Improvement of capacity building arm of Livestock and Dairy Development, particularly AHITI and its facility to deliver butcher training program as prerequisite for licensing local butchers
- Improvement of current local transportation practices (application of cold chain) and enforcement of regulations to ensure product compliance along the value chain.

### **Food business operator level**

- Development of curriculum for meat processing to facilitate the development of value-added products. This curriculum should consider export market preferences in terms of quality as well as the inclusion of a food safety component;
- Support in the establishment of an association for meat producers in the province to be represented through a convening body;
- Design of financial schemes for small and medium enterprises to improve their food safety and quality compliance level
- Assessment of current water and electricity capacities against maintaining the compliance of products for food business operators
- Policy development for the export to encourage the meat export and facilitating the food business operators at the borders by establishing the facilitating booth
- Developing grading system for the culled and fattened animal meat to promote the calf fattening to strengthen the cattle meat value chain

### **Farm level**

- Introduction of Good Animal Husbandry Practices (GAHP) for small-scale farmers in form of visual guidelines distributed through AHITI;
- Development of meat breeds for animals to improve the productivity and sustainability of the CVC.
- Improvement of vaccination practices through introduction of vaccine toolkit and their compliance level
- Farmers lack training on commercial farming practices and development of model fattening farms so training farmers for fattening farms establishment for cattle is needed for value chain.
- Marketing channel of the cattle meat animals is mainly dominated by middle man so improving of marketing channels by differentiation for culled or fattened animal meat and developing market channel through clustering and connecting high end markets will help to get good price of the animals.
- Farmers lack finance for establishing commercial farms so providing them interest free loan on easy installment for establishing farms will be helpful for developing cattle value chain in province
- The people generally lack cooperation for farming activities with each other so developing cooperation by linking or clustering farmers will be helpful for marketing of animals on good price
- the farmers of the cattle value chain be trained using proper knowledge transfer
- for establishment of calf fattening farms as well

### **Consumer level**

- Creation of demand for safe meat and meat based product from consumer side and raising awareness on socio-economic consequences of unsafe meat. Toxoplasmosis and miscarriage serves as an example of socio-economic challenges, still impacting local people



- Literature development through print and electronic media regarding food safety importance and compliance in meat value chain

### 3.3 Roadmap

The following roadmap detailed in line with recommendations presented above. The implementation of activities is expected to require technical and financial support from Government of KPK and international donors as well as close coordination between all stakeholders, producers, and value chain agents. The roadmap encompasses a timeline of ten years, considering Year 1 to Year 3 as short term, Year 3 to Year 5 as medium term, and Year 5 to Year 10 as long-term scenarios.

Tabla 10 Roadmap for developing cattle value chain in the selected districts of the province

Activity	Objective	Recommended Actions	Short-Term Year 1-3	Medium Term Year 3- 5	Long Term Year 5-10
<b>Production</b>	Ensure Availability of healthy animals	Cattle meat breeds development for better and sustainable meat supply chain			
		Provision of trainings for commercial cattle farming for farmers			
		Production and marketing of animal especially calves			
		Vaccination and facilities for monitoring animal health			
		Artificial insemination facilities for the better genetic breeding animals			
<b>Slaughtering and post-slaughtering transportation</b>	<b>Infrastructure</b>	Construction of road and installation of tiles, wire gauze for improvement of safety			
		Construction of waste disposal area for hygienic facilities			
		cold storage at local facility, cutting machine Improving the hygienic			
	<b>Transportation</b>	Meat transportation van with cold storage facility for the transportation of meat			
<b>Marketing</b>	National Level Marketing	Explore linkage development with new wholesale markets/mandis, e.g. Islamabad			
		Establish linkages with high end market segments, e.g. Metro and Hyper Star			
	International Level	Market access through agreement on bilateral protocols, especially with China			

	Marketing	and Afghanistan			
		Improvements in existing National Quality Infrastructure (NQI) for compliance with protocols			
		Development of KP-based quality Scheme linked with the NQI			
		Training to framers, meat processors and value chain agents on the implementation of agreed standards			
		Establishment of GMP, GHP, HACCP and FSSC 22000 food safety approaches and integrated with cold stores and food grade packaging material			
		Improvements in packaging methods and materials			
		Operationalization of air cargo facilities for direct access to high paying international markets			
Inspection and monitoring facilities	Inspection	Capacity development on the inspection process and procedure for the fresh meat and meta products			
	Analysis facility	Provision of toolkits and analysis facilities for rapid and onsite testing to improve complaisance of the cattle meat and meat products			
Value addition and product development	Food processing	The introduction of new meat products for commercialization and value addition			
	Compliance of food products	Compliance of cattle meat products be improved for the export			
Extension services and trainings	Technical Knowhow and Research in Cattle meat value	Staffing the unit with cattle meat and food safety specialist focused on value chain approach			
	Improved Outreach	Enhance the meat value chain research capacity especially in analysis and food safety compliance of the Government of KP			
		Re-orient focus of extension services to all value chain agents and not only			

		producers			
		Provision of reliable toolkits along with analysis facility and transport for comprehensive farmer outreach			
		Recruitment of women extension workers to ensure effective outreach to women			
<b>Policy and legislations development</b>	Policy and legislation development	Development of inspection protocols and standard operating procedure (SOP) for inspection of cattle meat and meat products			
		Export policy for meat animals, meat carcass and slaughtering (meatless days) for export			
		Livestock and dairy development Extension department; producers; value chain agents (lead enterprises and meat processors) as well as leading development sector organization e.g. SR Sarhad Rural Support Programme (SRSP)			

## References

1. <https://open.unido.org/api/documents/15219840/download/Project%20document.pdf>
2. United Nations Food and agriculture organization (FAO). 2018. World Livestock: Transforming the livestock sector through the Sustainable Development Goals. Rome. 222 pp. License: CC BY-NC-SA 3.0 IGO.
3. Khan H, Ullah S, Salman M, Hussain F, Anwar Y, Ullah I, Khan IA, Hussain H, Naeem I, Khan A, Khan H. Microbiological Safety and Antibigram Analysis of Selected Food Products Obtained in the Marketplace of Peshawar and Mardan, KPK, Pakistan. 2019. Polish Journal of Environmental Studies. 28(6):4239-45.
4. Akhtar S. Food safety challenges—a Pakistan's perspective. 2015. Critical reviews in Food Science and Nutrition. 55(2):219-26.
5. United Nations Industrial Development Organization (UNIDO). 2013. Greening Food and Beverage Value Chains: the Case of the Meat Processing Industry.
6. Majid A, Khan S, Jan AH, Taib M, Adnan M, Ali I, Khan SN. 2016. Chronic toxoplasmosis and possible risk factors associated with pregnant women in Khyber Pakhtunkhwa. Biotechnology & Biotechnological Equipment. 30(4):733-736.
7. Basit A, Hussain M, Ayaz S, Shahid M, Rahim K, Ahmad I, Ullah R, Hashem A, Abd-Allah E, Alqarawi AA, Gul N. 2015. Isolation and identification of mycobacterium bovis and mycobacterium tuberculosis from animal tissues by conventional and molecular method. Indian Journal of Animal Research. 49(5):687-93.
8. Trade Related Challenges Facing Exporters in Pakistan. Pakistan Institute of Development Economics Quaid-i-Azam University Campus, Islamabad
9. Hasnain H. Value chain analysis of the meat sector in Pakistan.
10. Meat value chain assessment of the livestock sector in Pakistan
11. Pakistan Today. 2019. KP Food Authority seizes huge quantity of minced unhygienic meat, March 17 and accessed on March 03, 2020 <https://www.pakistantoday.com.pk/2019/03/17/kp-food-authority-seizes-huge-quantity-of-minced-unhygienic-meat/>
12. Business recorder. 2018. KP food authority for improving condition of slaughterhouses. June 11<sup>th</sup>, 2018 and accessed on March 03, 2020. <https://fp.brecorder.com/2018/06/20180611380849/>
13. Sohaib M, Jamil F. 2017. An insight of meat industry in Pakistan with special reference to halal meat: a comprehensive review. Korean Journal for Food Science of Animal Resources. 37(3):329.
14. Dawn. June 10, 2019. Organising the meat supply chain and accessed on March 01, 2020 <https://www.dawn.com/news/1487127>
15. Khyber Pakhtunkhwa Agriculture Livestock Cooperative Policy and Strategy A Ten Year Perspective
16. Khyber Pakhtunkhwa Food Safety and Halal Food Authority Act. 2014. Government of Khyber Pakhtunkhwa, Pakistan

17. Khyber Pakhtunkhwa Food Safety and Halal Food Authority regulations. 2017. Government of Khyber Pakhtunkhwa, Pakistan
18. United nations industrial development organizations (UNIDO). 2009. Agro-value chain analysis and development; the UNIDO approach. [https://www.unido.org/sites/default/files/2010-02/Agro\\_value\\_chain\\_analysis\\_and\\_development\\_0.pdf](https://www.unido.org/sites/default/files/2010-02/Agro_value_chain_analysis_and_development_0.pdf)
19. Delgado C, Rosegrant M, Steinfeld H, Ehui S, Courbois C. 2001. Livestock to 2020: The next food revolution. Outlook on Agriculture. 30(1):27-9.
20. Minister for Local Government KP briefed on Peshawar Meat Company. [https://www.aup.edu.pk/news\\_details.php?n\\_id=251](https://www.aup.edu.pk/news_details.php?n_id=251)
21. Khyber Pakhtunkhwa livestock policy 2018. 2018. Agriculture, Livestock, Fisheries and Cooperatives Department, Government of Khyber Pakhtunkhwa, Pakistan
22. Abrahamson M, Hooker E, Ajami NJ, Petrosino JF, Orwoll ES. 2017. Successful collection of stool samples for microbiome analyses from a large community-based population of elderly men. contemporary clinical trials communications. 7: 158-162.
23. Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R., Meybeck, A. 2011. Global Food Losses and Food Waste: Extent Causes and Prevention." Rome, Food and Agriculture Organization (FAO) of the United Nations.
24. Aulakh, Jaspreet, and Anita Regmi. 2013. Post-harvest food losses estimation-development of consistent methodology." Rome: FAO, PP: 4-9.
25. Hodges, R.J., J.C. Buzby, and B. Bennett. 2011. Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use." Journal of Agricultural Science 149:37-45.
26. ECD-FAO Agriculture outlook. (2016) Meat consumption (indicator). DOI:10.1787/agr\_outlook-2016-en (Accessed March 02, 2020)
27. Retamal, M., Glassmire, J., Abey Suriya, K., Turner, A., & White, S. (2009). The water-energy nexus: investigation into the energy implications of household rainwater systems. Institute for Sustainable Futures, University of Technology, Sydney.
28. National Climate change policy Pakistan 2012, Ministry of climate change government of Pakistan. Link <http://www.mocc.gov.pk/frmDetails.aspx>
29. Afzal M, Naqvi AN. Livestock resources of Pakistan: present status and future trends. Quart. Sci. Vis. 2004;9(1-2):15-27.
30. Mallhi IY, Sohaib M, Khan AU, Nawaz M. 2019. Evaluating food safety knowledge, practices, and microbial profile of meat in abattoirs and butchery shops in Lahore, Pakistan. Journal of food safety. 39(2):e12612.
31. Pakistan Bureau of Statistics, Government of Pakistan. 2017. <http://www.pbs.gov.pk/content/population-census>

32. Andaleeb N, Khan M, Shah SA. 2017. Factors affecting women participation in livestock farming in District Mardan, Khyber Pakhtunkhwa, Pakistan. *Sarhad Journal of Agriculture*. 33(2):288-292.
33. Heinz, G. (2008). *Abattoir Development Options and Designs for Hygienic Basic and Medium-Sized Abattoirs*. Food and Agriculture Organization, United Nations.
34. JICA 2016. Data collection survey on agriculture sector in Punjab and Khyber Pakhtunkhwa provinces. A report by Japan International Cooperation Agency, Asia Engineering Consultant Co., Ltd., A&M Consultant Inc and Kaihatsu Management Consulting Inc.
35. Fahad S, Wang J, Khan AA, Ullah A, Ali U, Hossain MS, Khan SU, Huong NT, Yang X, Hu GY, Bilal A. 2018. Evaluation of farmers' attitude and perception toward production risk: Lessons from Khyber Pakhtunkhwa Province, Pakistan. *Human and Ecological Risk Assessment: An International Journal*. 24(6):1710-22.
36. FAO. 2015. *Women in Agriculture in Pakistan*. Islamabad: FAO.

#### **ANNEX 1: SURVEY QUESTIONNAIRE or SEMI-STRUCTURED INTERVIEW SCHEDULES**

#### **ANNEX 2: FOCUS GROUP DISCUSSION GUIDELINES (FOR PRODUCER ASSOCIATION / ORGANIZATION MEMBERS)**

#### **ANNEX 3: Feasibility studies**



## DOCUMENTS REVIEWED DURING THE ASSIGNMENT

1. <https://open.unido.org/api/documents/15219840/download/Project%20document.pdf>
2. United Nations Food and agriculture organization (FAO). 2018. World Livestock: Transforming the livestock sector through the Sustainable Development Goals. Rome. 222 pp. Licence: CC BY-NC-SA 3.0 IGO.
3. Khan H, Ullah S, Salman M, Hussain F, Anwar Y, Ullah I, Khan IA, Hussain H, Naeem I, Khan A, Khan H. Microbiological Safety and Antibioqram Analysis of Selected Food Products Obtained in the Marketplace of Peshawar and Mardan, KPK, Pakistan. 2019. Polish Journal of Environmental Studies. 28(6):4239-45.
4. Akhtar S. Food safety challenges—a Pakistan's perspective. 2015. Critical reviews in Food Science and Nutrition. 55(2):219-26.
5. United Nations Industrial Development Organization (UNIDO). 2013. Greening Food and Beverage Value Chains: the Case of the Meat Processing Industry.
6. Majid A, Khan S, Jan AH, Taib M, Adnan M, Ali I, Khan SN. 2016. Chronic toxoplasmosis and possible risk factors associated with pregnant women in Khyber Pakhtunkhwa. Biotechnology & Biotechnological Equipment. 30(4):733-736.
7. Basit A, Hussain M, Ayaz S, Shahid M, Rahim K, Ahmad I, Ullah R, Hashem A, Abd-Allah E, Alqarawi AA, Gul N. 2015. Isolation and identification of Mycobacterium bovis and Mycobacterium tuberculosis from animal tissues by conventional and molecular method. Indian Journal of Animal Research. 49(5):687-93.
8. Trade Related Challenges Facing Exporters in Pakistan. Pakistan Institute of Development Economics Quaid-i-Azam University Campus, Islamabad
9. Hasnain H. Value chain analysis of the meat sector in Pakistan.
10. Meat value chain assessment of the livestock sector in Pakistan
11. Pakistan Today. 2019. KP Food Authority seizes huge quantity of minced unhygienic meat, March 17 and accessed on March 03, 2020) <https://www.pakistantoday.com.pk/2019/03/17/kp-food-authority-seizes-huge-quantity-of-minced-unhygienic-meat/>
12. Business recorder. 2018. KP food authority for improving condition of slaughterhouses. June 11<sup>th</sup>, 2018 and accessed on March 03, 2020. <https://fp.brecorder.com/2018/06/20180611380849/>
13. Sohaib M, Jamil F. 2017. An insight of meat industry in Pakistan with special reference to halal meat: a comprehensive review. Korean Journal for Food Science of Animal Resources. 37(3):329.
14. Dawn. June 10, 2019. Organising the meat supply chain and accessed on March 01, 2020 <https://www.dawn.com/news/1487127>
15. Khyber Pakhtunkhwa Agriculture Livestock Cooperative Policy and Strategy A Ten Year Perspective

16. Khyber Pakhtunkhwa Food Safety and Halal Food Authority Act. 2014. Government of Khyber Pakhtunkhwa, Pakistan
17. Khyber Pakhtunkhwa Food Safety and Halal Food Authority regulations. 2017. Government of Khyber Pakhtunkhwa, Pakistan
18. United nations industrial development organizations (UNIDO). 2009. Agro-value chain analysis and development; the UNIDO approach. [https://www.unido.org/sites/default/files/2010-02/Agro\\_value\\_chain\\_analysis\\_and\\_development\\_0.pdf](https://www.unido.org/sites/default/files/2010-02/Agro_value_chain_analysis_and_development_0.pdf)
19. Delgado C, Rosegrant M, Steinfeld H, Ehui S, Courbois C. 2001. Livestock to 2020: The next food revolution. Outlook on Agriculture. 30(1):27-9.
20. Minister for Local Government KP briefed on Peshawar Meat Company. [https://www.aup.edu.pk/news\\_details.php?n\\_id=251](https://www.aup.edu.pk/news_details.php?n_id=251)
21. Khyber Pakhtunkhwa livestock policy 2018. 2018. Agriculture, Livestock, Fisheries and Cooperatives Department, Government of Khyber Pakhtunkhwa, Pakistan
22. Abrahamson M, Hooker E, Ajami NJ, Petrosino JF, Orwoll ES. 2017. Successful collection of stool samples for microbiome analyses from a large community-based population of elderly men. contemporary clinical trials communications. 7: 158-162.
23. Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R., Meybeck, A. 2011. Global Food Losses and Food Waste: Extent Causes and Prevention." Rome, Food and Agriculture Organization (FAO) of the United Nations.
24. Aulakh, Jaspreet, and Anita Regmi. 2013. Post-harvest food losses estimation-development of consistent methodology." Rome: FAO, PP: 4-9.
25. Hodges, R.J., J.C. Buzby, and B. Bennett. 2011. Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use." Journal of Agricultural Science 149:37-45.
26. ECD-FAO Agriculture outlook. (2016) Meat consumption (indicator). DOI:10.1787/agr\_outlook-2016-en (Accessed March 02, 2020)
27. Retamal, M., Glassmire, J., Abey Suriya, K., Turner, A., & White, S. (2009). The water-energy nexus: investigation into the energy implications of household rainwater systems. Institute for Sustainable Futures, University of Technology, Sydney.
28. National Climate change policy Pakistan 2012, Ministry of climate change government of Pakistan. Link <http://www.mocc.gov.pk/frmDetails.aspx>
29. Afzal M, Naqvi AN. Livestock resources of Pakistan: present status and future trends. Quart. Sci. Vis. 2004;9(1-2):15-27.
30. Mallhi IY, Sohaib M, Khan AU, Nawaz M. 2019. Evaluating food safety knowledge, practices, and microbial profile of meat in abattoirs and butchery shops in Lahore, Pakistan. Journal of food safety. 39(2):e12612.

31. Pakistan Bureau of Statistics, Government of Pakistan. 2017. <http://www.pbs.gov.pk/content/population-census>
32. Andaleeb N, Khan M, Shah SA. 2017. Factors affecting women participation in livestock farming in District Mardan, Khyber Pakhtunkhwa, Pakistan. *Sarhad Journal of Agriculture*. 33(2):288-292.
33. Heinz, G. (2008). Abattoir Development Options and Designs for Hygienic Basic and Medium-Sized Abattoirs Food and Agriculture Organization.
34. JICA 2016. Data collection survey on agriculture sector in Punjab and Khyber Pakhtunkhwa provinces. A report by Japan International Cooperation Agency, Asia Engineering Consultant Co., Ltd., A&M Consultant Inc and Kaihatsu Management Consulting Inc.
35. Fahad S, Wang J, Khan AA, Ullah A, Ali U, Hossain MS, Khan SU, Huong NT, Yang X, Hu GY, Bilal A. 2018. Evaluation of farmers' attitude and perception toward production risk: Lessons from Khyber Pakhtunkhwa Province, Pakistan. *Human and Ecological Risk Assessment: An International Journal*. 24(6):1710-22.
36. Ullah W, Nihei T, Nafees M, Zaman R, Ali M. 2018. Understanding climate change vulnerability, adaptation and risk perceptions at household level in Khyber Pakhtunkhwa, Pakistan. *International Journal of Climate Change Strategies and Management*.

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN**  
**In-Depth Interviews (IDI) –Butchery shops (Brief)**  
**Value Chain Analysis of Cattle Meat**

Name of District	
Name of Tehsil	
Name of Union Council	
Name of Village Council	
Name and Designation of Respondents	
Name and Type of Business	
Name of the Interviewer	
Date	
Starting Time of KII	
Finishing Time of KII	

**Questions**

1. When was your butchery shop established?
2. Location of the butchery shop.....
3. What is your method of procurement of animals?

- a) Farmer                      b) middlemen                      c) animal mandi                      d) All
4. Do you have access to clean water .....Yes/No..... and electricity .....Yes/No.....
5. At which place you slaughter animals for meat  
a) Shop/home                      b) Slaughterhouse                      c) Meat sourcing from supplier
6. Do you follow any procedure for cleaning shop on daily basis.....Yes/No.....
7. Do you have storage facilities like refrigerator or freezer for meat.....Yes/No.....
8. Total workers ..... In your business and out of total women.....
9. How much you earn (in rupees) on monthly basis from this business.....
10. Does your shop have any food safety training?  
a) Good Manufacturing practices                      b) HACCP                      c) None                      d) Any other  
.....
11. Does your shop or meat animals inspected in last two years by livestock department.....Yes/No..... or KP food safety and halal food authority.....Yes/No
12. If yes, then frequency of the visits by livestock department? a) daily b) quarterly c) monthly d) annually
13. If yes, then frequency of the visits by KP Food Safety and Halal Food Authority?  
a) daily                      b) quarterly                      c) monthly                      d) annually
14. What problems do you face with procurement? E.g. animal weight, produce not according to market specification, too much price etc.
15. In which month of the year you pay highest and lowest price to the supplier for cattle meat animals over the year?  
a) Highest price month ..... b) lowest price month .....  
c) price remain same throughout year .....

Cost Benefit Analysis (Butchery Shops)			
Activity	Unit	Duration/Number of Unit	Wage/unit
Cost			
Cost of meat animal	Mound/Tonne		
Cost of fresh meat	Mound/Tonne		
Rent of Shop	Per Month		
Labour Cost (Workers)	Labour (daily/Monthly)		
Utilities	Per Month		
Storage Cost	Per Month		
Marketing Cost (if any)	Per Month		
Cost of Value Addition	Per Mound/Tonne		

Transportation Cost	Per Month		
<b>Revenue</b>			
Price	Kg/Mound/Tonne	Day/Month	



**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN**  
**In-Depth Interviews (IDI) –Butchery shops (FGD)**  
**Value Chain Analysis of Cattle Meat**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Union Council</b>	
<b>Name of Village Council</b>	
<b>Name and Designation of Respondents</b>	
<b>Name and Type of Business</b>	
<b>Name of the Interviewer</b>	
<b>Date</b>	
<b>Starting Time of KII</b>	
<b>Finishing Time of KII</b>	

## OPERATIONS

16. When was your butchery shop established?
17. How do you classify the size of your operation in relation to market you are working in?  
Small, Medium, Large
18. Do you slaughter animals at your shop, home or slaughterhouse for meat?
19. How many workers.....involved in this business and how many animals.....(approx. weight)..... do you slaughter daily?
20. Does you or your workers have any food safety trainings? If yes then when was the last time of the training
21. Does your shop have any food safety training?  
a) Good Manufacturing practices                      b) HACCP                      c) None                      d) Any other  
.....
22. Does your shop or meat animals inspected in last two years by livestock department.....Yes/No..... or KP food safety and halal food authority.....Yes/No
23. Does your shop or meat animals been fined by livestock department or KP food safety and halal food safety authority in last two years? If yes, then frequency of the visits?

## PROCUREMENT

24. In your province, which area is mostly famous for availability of animals to be purchased?
25. Which districts/UCs are your procuring cattle meat animals for the meat supply?
26. What is your method of procurement of animals?  
a) Farmer                      b) middlemen                      c) animal mandi                      d) All
27. What are advantages and disadvantages of these procurement channels? E.g. volumes, quality, timeliness, price, etc.
28. What is the duration of the purchase? From \_\_\_\_\_ month to \_\_\_\_\_ month or round the year
29. Average number of animals purchased by your business per month?.....
30. What price do you pay the supplier at different times of the year?
31. What are the terms of payment? E.g. advance payments, payment upon delivery, etc.
32. What problems do you face with procurement? E.g. animal weight, produce not according to market specification, too much price etc.
33. Do you provide any cost premiums or benefits in case any suppliers meet or over achieve the market criteria for quality? If yes, what are these benefits and how are these determined? If no, what is the reason for not providing such premiums?

## SERVICES

34. Besides purchasing the produce, do you also provide any additional services to your vendors? E.g. production inputs, credit, advisory services, transport facility, packaging materials, etc. If yes, please provide details
35. What problems do you face when providing these services? E.g. recovery of loan, limited ability to advance credit, etc.

#### VALUE ADDITION

36. After purchasing from vendors, do you undertake any value addition functions? E.g. fattening, lairage, meat cuts, grading, packaging, aging etc.?
37. If yes, what is reason for undertaking these functions? E.g. higher price, easier to market, shelf life increased, etc.?
38. What is the estimated cost per Kg of performing these functions? (e.g. cost of labor, space, materials, etc.)
39. What problems do you face in undertaking these functions? E.g. expenses, lack of knowhow, space, materials, product perishability, etc.

#### MARKETS

40. What are the different categories of your buyers and the average price paid?

Type of Buyer	Location (District/Market, etc.)	Proportion Sold	Average Price Paid by Buyer (PKR/Kilo)
International Buyers			
Wholesalers			
Consumers			
Processors			
Food Services Industry			
Other (specify)			

41. What are preferred meat specifications of different markets? E.g. variety, color, size, flavor, time, packaging, etc.?
42. What problems do you encounter in meeting these specifications?
43. Do you receive any price premiums or advantages when providing produce according to or exceeding market specification?

#### INPUTS AND SERVICES

44. In addition to purchasing meat animals, do the buyers provide you any support services? E.g. finance, transport, packaging, etc.? If yes, please provide details
45. What are the advantages and disadvantages of using these services?
46. How often do you obtain loans for your business operations and from where you get that? Also, what is the average loan size, duration, and interest rate, etc.?

47. What are the most accessible sources of credit for your business?
48. What challenges do you face in borrowing or utilizing the credit from these sources?

### CONCLUSIONS AND RECOMMENDATIONS

49. If you wished to expand your business operations, what would be ideal expansion? E.g. reaching more farmers, improving value addition, reaching new markets, etc.
50. What potential factors do you see as hindrances or challenges to prevent you from meeting this objective?
51. What are your recommendations for development of cattle meat value chain in KP?

Cost Benefit Analysis (Butcher shops)			
Activity	Unit	Duration/Number of Unit	Wage/unit
Cost			
Cost of meat animal	Mound/Tonne		
Cost of fresh meat	Mound/Tonne		
Rent of Shop	Per Month		
Labour Cost (Workers)	Labour (daily/Monthly)		
Utilities	Per Month		
Storage Cost	Per Month		
Marketing Cost (if any)	Per Month		
Cost of Value Addition	Per Mound/Tonne		
Transportation Cost	Per Month		
Revenue			
Price	Kg/Mound/Tonne	Day/Month	

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN**  
**In-Depth Interviews (IDI) –Meat hypermarkets/stores**  
**Value Chain Analysis of cattle meat**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Union Council</b>	
<b>Name of Village Council</b>	
<b>Name and Designation of Respondents</b>	
<b>Name and Type of Business</b>	
<b>Name of the Interviewer</b>	
<b>Date</b>	
<b>Starting Time of KII</b>	
<b>Finishing Time of KII</b>	

When was your meat store/hypermarkets established?

1. Location of the butchery shop.....
2. What are main activities undertaken by your hypermarket for meat supply? E.g animal procurement, slaughtering, inspection, meat cuts, etc.
3. Total workers ..... In your business and out of total women.....
4. How much you earn (in rupees) on monthly basis from this business.....
5. At which place you slaughter animals for meat  
a) Shop/home                      b) Slaughterhouse                      c) Meat sourcing from supplier
6. How many animals .....with (approximate weight in kg)..... do you slaughter on daily basis for supply of meat?
7. Does your store has any food safety or hygiene training? If yes then which one .....
8. Does your store meat animals being inspected by livestock department or KP food safety and Halal Food Safety Authority peoples? If yes, then frequency of the visits?
9. Do you follow any other certification scheme related to food safety? If yes which certification and who conducted the audit?
10. Do you follow any special practice with parts of the animal which is not sold by your store? (Skin, bones, organs etc.). If yes please specify.
11. Do peoples prefer to buy from these meat hyper stores or regular butchery shops for meat. Yes/No
12. How many other hypermarkets/meat stores working in this market?

Classification of Trader	Percentage of Traders in Market
Small	
Medium	
Large	

## PROCUREMENT

13. Which districts/UCs do you purchase cattle meat animals for supply of meat?
14. What is your method of procurement of animals?  
a) Farmer                      b) middlemen                      c) Animal mandi                      d) All
15. What are the advantages and disadvantages of these different procurement channels? E.g. volumes, quality, timeliness, price, etc.
16. What is the duration of the purchase? From \_\_\_\_\_ month to \_\_\_\_\_ month
17. What is the average number of cattle meat animals purchased by your business per month?
18. In which month of the year you pay highest and lowest price to the supplier for cattle meat animals over the year?  
a) Highest price month .....; b) lowest price month .....;  
c) price remain same throughout year .....



19. What problems do you face with procurement? E.g. produce not according to market specification, improper grading, fraudulent packaging, etc.
20. Do you provide any cost premiums or benefits in case any suppliers meet or over achieve the market criteria for quality? If yes, what are these benefits and how are these determined? If no, what is the reason for not providing such premiums?

### SERVICES

21. Besides purchasing the produce, do you also provide any additional services to your vendors? E.g. production inputs, credit, advisory services, packaging materials, etc. If yes, please provide details
22. What problems do you face when providing these services? E.g. recovery of loan, limited ability to advance credit, etc.

### VALUE ADDITION

23. After purchasing from the vendors, do you undertake any value addition functions? E.g. grading, sorting, packaging, storing, etc.?
24. If yes, what is the reason for undertaking these functions? E.g. higher price, easier to market, etc.?
25. What is the estimated cost per Kg of performing these functions? (e.g. cost of labour, space, materials, etc.)
26. What problems do you face when undertaking these functions? E.g. expense, lack of knowhow, space, materials, product perishability, etc.
27. By not performing these functions do you suffer any product losses? If yes, how much and why?

### MARKETS AND TRANSPORT

28. What are the different categories of your buyers and the average price paid?

Type of Buyer	Location (District/Market, etc.)	Proportion Sold	Average Price Paid by Buyer (PKR/Kilo)
International Buyers			
Wholesalers			
Consumers			
Processors			
Food Services Industry			
Other (specify)			

29. What are preferred product specifications of different markets? E.g. breed, color, weight, time, packaging, etc.?
30. What problems do you encounter in meeting these specifications?
31. Do you receive any price premiums or other advantages when providing the produce according to or exceeding the market specification?

## TRANSPORT

32. How do you transport the meat animals from farm/market to your location?
33. What is the price per Kg of transporting the produce to the market?
34. What problems do you face with transportation? E.g. lack of proper roads in production areas, limited availability during festive season, price fluctuation etc.?

## INPUTS AND SERVICES

35. In addition to purchasing the products, do these buyers provide you any support services? E.g. finance, transport, packaging, etc.? If yes, please provide details
36. What are the advantages and disadvantages of using these services?
37. How often do you obtain loans for your business operations? and what is the average loan size, duration, and interest rate, etc.?
38. What are the most accessible sources of credit for your business?
39. What challenges do you face in borrowing or utilizing the credit from these sources?
40. Do you have access to clean water and electricity for your operation? If any limitation please specify

## CONCLUSIONS AND RECOMMENDATIONS

41. If you wished to expand your business operations, what would be the ideal expansion? E.g. reaching more farmers, improving value addition, reaching new markets, etc.
42. What potential factors do you see as hindrances or challenges to prevent you from meeting this objective?
43. What additional services would you need for successful operation?

Cost Benefit Analysis (Meat Stores)			
Activity	Unit	Duration/Number of Unit	Wage/unit
Cost			
Cost of meat animals	Mound/Tonne		
Cost of fresh meat	Mound/Tonne		
Rent of Shop	Per Month		
Labour Cost (Workers)	Labour (daily/Monthly)		
Utilities	Per Month		
Storage Cost	Per Month		
Marketing Cost (if any)	Per Month		
Cost of Value Addition	Per Mound/Tonne		
Transportation Cost	Per Month		
Revenue			
Price	Kg/Mound/Tonne	Day/Month	

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN**

**Key Informant Interview (Exporters)**

## Value Chain Analysis of Cattle Meat

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Union Council</b>	
<b>Name of Village Council</b>	
<b>Name and Designation of Respondents</b>	
<b>Name and Type of Business</b>	
<b>Name of the Interviewer</b>	
<b>Date</b>	
<b>Starting Time of KII</b>	
<b>Finishing Time of KII</b>	

## OPERATIONS

1. What are the main activities undertaken by your enterprise?
2. How long have you been involved in this business?
3. How many workers does your business employ and what are the functions performed by these individuals?
4. How many of these workers are hired and how many belong to your family?
5. How many of your workers are men and how many are women?
6. Have the workers involved in slaughtering, cutting and value addition have been engaged in food safety training? If yes, training frequency, workers trained and future plans for training
7. Is any of your premises food safety certified? If yes which certification do you follow and which certification body conducted this certification?
8. Do you have a personnel assigned as a food safety manager? If yes, please share the profile (education, experience and trainings in food safety).
9. How many other wholesalers of cattle meat value chain are working in this market?

Classification of Trader	Percentage of Traders in Market
Small	
Medium	
Large	

## PROCUREMENT

10. Which districts/UCs do you purchase animal for cattle meat from?
11. What is your procurement method? E.g. on farm purchase, middleman, farmer market, etc.
12. What are the advantages and disadvantages of these different procurement channels? E.g. volumes, quality, timeliness, price, etc.
13. What is the duration of the purchase? From \_\_\_\_\_ month to \_\_\_\_\_ month
14. What is the total number of cattle herds purchased by your business per month?
15. What is the criteria/standard followed by you for the animal purchase. e.g. animal health, beauty, animal weight, animal age, time of the year ?
16. What price do you pay the supplier for animal procurement at different stages of year?

Eid ul Azha	Time of Year (Week/Month)	Price Paid (PKR/kilo)
Before 3 months of Eid		
After Eid		
After 3 month of Eid		

17. What are the terms of payment? e.g., advance payments, payment upon delivery, any other mode etc.
18. What problems do you face with procurement? E.g. produce not according to market specification, diseased animal, underweight, fraudulent weight of animal, etc.
19. How much produce is deteriorated or spoiled due to these issues? How do you manage to overcome these problems?
20. Do you provide any cost premiums or benefits in case any suppliers meet or over achieve the market criteria for quality? If yes, what are these benefits and how are these determined? If no, what is the reason for not providing such premiums?

### SERVICES

21. Besides purchasing the produce, do you also provide any additional services to your vendors? E.g. production inputs, credit, certification support, advisory services , etc. If yes, please provide details
22. What problems do you face when providing these services? E.g. recovery of loan, limited ability to advance credit, etc.

### VALUE ADDITION

23. After purchasing from the vendors, do you undertake any value addition functions? E.g. Lairage, fattening, grading, sorting, packaging storing, etc.?
24. If yes, what is the reason for undertaking these functions? E.g. higher price, easier to market, etc.?
25. What is the estimated cost per Kg of performing these functions? (e.g. cost of labour, space, materials, etc.)
26. In case of packing / covering meat, what type of packaging material do you use and from where do you obtain?
27. What problems do you face when undertaking these functions? E.g. expense, lack of knowhow, space, materials, product perishability, etc.
28. By not performing these functions do you suffer any product losses? If yes, how much and why?

### MARKETS AND TRANSPORT

29. What are the major markets where you sell the cattle meat?
30. Which of these are your preferred markets? What are the reasons for this preference?
31. What are the different categories of your buyers and the average price paid?

Type of Buyer	Location (District/Market, etc.)	Proportion Sold	Average Price Paid by Buyer (PKR/Kilo)
International Buyers			
Retailers/Butchery shops			



Meat Processors			
Food Services Industry			
Other (specify)			

32. What are the preferred product specifications of the different markets? E.g. breed, animal weight, color, size, flavor, packaging, etc.?
33. What problems do you encounter in meeting these specifications?
34. Do you receive any price premiums or other advantages when providing the produce according to or exceeding the market specification?

### **TRANSPORT**

35. How do you transport the product to your end buyer?
36. Do you have any vehicles and if yes are they cold-chain? How often and where do you clean the transport part of the vehicle?
37. What is the price per Kg of transporting the produce to the market?
38. What problems do you face with transportation? E.g. availability of containers, chilling room, temperature control for the chiller, lack of proper roads in production areas, etc.?
39. How do these problems affect the quality and price of produce? Please provide details? E.g., what portion of the produce is spoiled? How much is the price in the market lowered? Etc.

### **INPUTS AND SERVICES**

40. In addition to purchasing the products, do these buyers provide you any support services? E.g. finance, transport, food safety, workers training, etc.? If yes, please provide details
41. What are the advantages and disadvantages of using these services?
42. How often do you obtain loans for your business operations? In addition, what is the average loan size, duration, and interest rate, etc.?
43. What are the most accessible sources of credit for your business?
44. What challenges do you face in borrowing or utilizing the credit from these sources?
45. Do you have access to clean water and electricity for your business operation? If you have any limitation please specify.

### **CONCLUSIONS AND RECOMMENDATIONS**

46. If you wished to expand your business operations, what would be the ideal expansion? E.g. reaching more farmers, improving value addition, reaching new markets, etc.
47. What potential factors do you see as hindrances or challenges to prevent you from meeting this objective?
48. What are your recommendations for the development of cattle value chain production or marketing in KP?

Cost Benefit Analysis (Meat Exporters)			
Activity	Unit	Duration/Number of Unit	Wage/unit
Cost			
Cost of meat animal	Mound/Tonne		
Cost of cattle meat	Mound/Tonne		
Rent of Shop/slaughterhouse	Per Month		
Labour Cost (Workers)	Labour (daily/Monthly)		
Utilities	Per Month		
Storage Cost	Per Month		
Marketing Cost (if any)	Per Month		
Cost of Value Addition	Per Mound/Tonne		
Transportation Cost	Per Month		
Cost of food safety practices	Per Month		
Revenue			
Price	Kg/Mound/Tonne	Day/Month	

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN**  
**In-Depth Interviews (IDI) –Meat Processor**  
**Value Chain Analysis of cattle Meat**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Union Council</b>	
<b>Name of Village Council</b>	
<b>Name of Interviewee</b>	
<b>Name and Type of Business</b>	
<b>Name of the Interviewer</b>	
<b>Date</b>	
<b>Starting Time of IDI</b>	
<b>Finishing Time of IDI</b>	

1. What are the main products produced by your enterprise?
2. How long have you been involved in this business?
3. How many other enterprises similar to yours operate in this district?

Size	Percentage of Total Enterprises in the District (%)
Small	
Medium	
Large	

4. Does your business have any form of quality certification? E.g. GMP, Halal, HACCP, ISO, etc.
5. How many workers does your business employ and what are the functions performed by these individuals?
6. How many of these workers are hired and how many belong to your family?
7. How many of your workers are men and how many are women?
8. Does your workers have any training on food safety standard?
9. Is there a food safety officer / manager at your premises?
10. What procedure do you follow with parts of the animal which is not sold by your company (bones, organs, skin etc.)? Please specify.

#### PROCUREMENT

11. What are the main meat products processed by your processing business?
12. On average, how much cattle meat animals does your business procure per month and how much meat you process in one month? \_\_\_\_\_Mounds
13. At what time of the year do you procure cattle for fresh meat? (Mention months/weeks of year)
14. Where do you procure this cattle meat animals? Please provide details. E.g. Names of wholesale markets, districts, union councils, etc.
15. How many vendors/farmers do you purchase from in an average month?
16. What is the average price paid per kilo to vendors vs. farmers?
17. What problems do you face with procurement from each source? E.g. insufficient quantity, distance to seller, lack of transport, Quality and safety issue, animal health etc.
18. What is the average cost of transport per animals (approximate)?
19. From where do you obtain packaging material for your products and what material do you use?

#### SUPPORT

20. In addition to providing marketing services for produce, do you also provide farmers/vendors any additional services? E.g. credit, advisory, inputs, etc.
21. In what form do you receive payment for these inputs or services? E.g., upfront payment, payment upon harvest, etc.

## **VALUE ADDITION & PROCESSING**

22. After purchasing the product, what sort of processes do you have to perform? E.g. Animal's vaccination, inspection, sorting, grading, washing, slaughtering, processing, aging, product development etc.
23. What are the different processed and by products of cattle meat produced by your facility? E.g. nuggets, sausages, patties, kabab etc.
24. In addition to the fresh meat, what other ingredients/raw materials do you require producing your products? E.g. sugar, preservatives, additives, salts etc.
25. Where do you procure these raw materials from?
26. What is the average cost of processing per KG of product produced?
27. Do you have access to clean water and electricity in case of your facility?

## **MARKETS**

28. What are the major markets and buyers of your processed products?
29. How long have you been supplying to these markets?
30. What are the marketing channels utilized by you? E.g. direct sales, distributors, middlemen, etc.
31. What are the main issues faced in supplying to these markets? E.g. unable to meet quantity or quality demanded, lack of suitable transport, etc.
32. What are the ideal markets where you should be selling your product?
33. What factors are limiting you from accessing these markets? E.g. lack of credit for business expansion, lack of linkages in market, lack of quality product or quality certification, etc.

## **EXTERNAL SUPPORT & CREDIT**

34. Has your business received any support from the Government, international development agencies, or any other entities over the past five years? If yes, please provide details (name of project, support received, outcome)
35. How often do you have to obtain loans for business purposes?
36. What are the most accessible/utilized sources of this financing?
37. What are the terms of credit? E.g. duration, payback period, interest rate, etc.
38. What are the problems in accessing or utilization of this credit?

## **FUTURE PLANS**

39. What are your plans for future expansion of your processing business?
40. What actual or potential challenges are you likely to face in executing these plans? E.g. lack of finance, knowhow, linkages, trained workforce, etc.
41. What are your recommendations for the development of livestock with special focus to cattle meat value chain?

### **Cost Benefit Analysis (Cattle Meat Processors)**



Activity	Unit	Duration/Number of Unit	Wage/unit
<b>Cost</b>			
Cost of meat animal	Mound/Tonne		
Cost of fresh meat	Mound/Tonne		
Rent of Shop	Per Month		
Labour Cost (Workers)	Labour (daily/Monthly)		
Utilities	Per Month		
Storage Cost	Per Month		
Marketing Cost (if any)	Per Month		
Cost of Value Addition	Per Mound/Tonne		
Transportation Cost	Per Month		
<b>Revenue</b>			
Price	Kg/Mound/Tonne	Day/Month	

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN**  
**Key Informant Interview (Non-Governmental Organization (NGOs, etc.)**  
**Value Chain Analysis of Cattle Meat**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Union Council</b>	
<b>Name of Village Council</b>	
<b>Name and Designation of Respondents</b>	
<b>Name of Organization</b>	
<b>Name of the Interviewer</b>	
<b>Date</b>	
<b>Starting Time of KII</b>	
<b>Finishing Time of KII</b>	

## **ORGANIZATIONAL AND POLICY BACKGROUND**

1. How is your department/organization involved in providing support to the livestock development in KPK?
2. What are the major Government policies at national or provisional level that govern livestock sector particularly cattle production and marketing?
3. How do these strategies influence the production and marketing of cattle from KP?
4. Does your department/organization have a strategic vision/plan for the development of cattle value chains in KP? If yes, please provide details. (If possible, please also share the strategy document)
5. Has your department/organization undertaken any projects or activities for the development of production or marketing of cattle including cow and buffalo over the past 5-10 year period? If yes, please provide details of each project. (e.g. timeline, key activities, key public and private partners, geographic areas of focus, and key project results, etc.)
6. What major challenges did you face in implementing the above-mentioned projects and how were these mitigated?
7. Are you aware of any another department/organization (e.g. NGO, donor, public agency) that has implemented a project for the development of cattle value chains over the past five years? If yes, please provide details (name of organization, timeline of project, major activities, major outcomes, etc.)

## **SUPPORT TO PRODUCTION AND MARKETING**

8. What are the key cattle breeds present in KP districts including Peshawar, Abbottabad, Kohistan and D.I. Khan that is used for meat supply chain in these districts of KP?
9. What are the key production zones, marketing zone and potential slaughterhouse presence for cattle in Peshawar, Abbottabad, Kohistan and D.I. Khan in KP?
10. What is the proportion of small, medium, and large-scale farmers involved in cattle rearing in these production areas?
11. What is the total cattle herds produced in Peshawar, Abbottabad, Kohistan and D.I. Khan in KP annually?
12. What are the average rearing age, slaughtering age and total number of hers slaughtered annually/monthly of the total produced?
13. What are the major sources of Agricultural Statistics developed or utilized by the KP government?
14. Who are the key public and private stakeholders engaged in the development of livestock /cattle /meat value chains in KP? (e.g. Government agencies/departments, NGOs, progressive/large farmers, key traders or exporters, etc.)?
15. What are the major problems faced by the producers of cattle in production and marketing of their produce?

16. What are the key national and international markets for cattle meat and byproducts from KP?
17. What are the opportunities and challenges in accessing these markets? (e.g. product quality, quantity, transport, festive season, processing, etc.)
18. What are your overall recommendations for the improvement of cattle /meat value chain in KP? e.g. support to improvement in production, processing, products certification, food safety, marketing, export, etc. (These may or may not be related to the work of your department/organization).
19. What are current resources and/or assets of your department/organization to support this vision? (e.g. technical resources, extension services, processing facilities, research and testing facilities, etc.)
20. What current or potential challenges will your department face in supporting this vision? (e.g. Human Resource, Finance, Technical Expertise, Equipment, etc.)?
21. How can these resources be further strengthened and challenges potentially mitigated with UNIDO's support?

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN**  
**Key Informant Interview (NGOs/Donors, Projects, Etc.)**  
**Value Chain Analysis of Cattle Meat**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Union Council</b>	
<b>Name of Village Council</b>	
<b>Name and Designation of Respondents</b>	
<b>Name of the Interviewer</b>	
<b>Date</b>	
<b>Starting Time of KII</b>	
<b>Finishing Time of KII</b>	

1. What is the development mandate of your organization/project?
2. Has your organization implemented a livestock development project with special focus on cattle value chain in KP over the past five years? If yes, please provide details (project duration, geographic focus, major activities, key stakeholders, major outcomes, etc.)
3. Who are the key public and private stakeholders of your project? In addition, what is the instrumental role played by these?
4. What challenges have you faced in the implementation of the above project? E.g. Policy, infrastructure, culture, production quality, food safety, lack of legislation etc.
5. What opportunities were you presented with during implementation of the project? (e.g. responsive producers, high demand, etc.)
6. If your project is ongoing, how can synergies be developed between your project and the potential UNIDO assisted project? (e.g. joint activities, areas where UNIDO can fill gaps for ongoing activities, etc.)
7. What are your general recommendations for the design and implementation of the proposed UNIDO project? (in the areas of Policy, legislation development, Govt. capacity development, improvement in processing, and marketing).



**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN  
QUESTIONNAIRE FOR FOCUS GROUP DISCUSSION (FGD) WITH FARMERS  
VALUE CHAIN ANALYSIS OF CATTLE MEAT**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Union Council</b>	
<b>Name of Village Council</b>	
<b>Number of Participants</b>	<b>1. Male          2. Female</b>
<b>Contact No.</b>	
<b>Name of the Interviewer</b>	
<b>Date</b>	
<b>Starting Time of FGD</b>	
<b>Finishing Time of FGD</b>	

## GENERAL

1. What is the average landholding in your area?
2. Which meat do people in your area prefer?
3. What are the major animals reared for meat in your area?
4. What is the average number of cattle as meat animals in your area in a farm?
5. What is the roles of men and women in raising the animal?

## PRODUCTION

6. Do you use same animal for meat that is used for dairy or separate meat animals are reared?
7. What are the common cattle breeds do you rear for meat animals?
8. What is the average live weight of cattle meat animals subjected to slaughtering? \_\_\_\_\_  
Maunds
9. What are the facilities livestock department provide on regular basis to these animals on farm? e.g. Vaccination, deworming, artificial insemination etc.
10. If the livestock department provide these services whether they charge any fee or provide free of cost to the farmers?
11. What are the available feed resources for the meat animals? E.g. grass, grains, feedstuff etc.
12. What are the major problems with production of cattle meat animals? E.g. low weight animals, diseased animals, feed inputs unavailability, high feed cost, etc.

## INPUTS AND MANAGEMENT

13. What are the major inputs in rearing of cattle as meat animals? And where do you obtain these inputs from? E.g. local store, middleman, main city, other parts of Pakistan, etc.
14. What problems do you face in obtaining these inputs like feed ingredients, vaccines? (e.g. high price, not available locally, not effective, not available on time, etc.)
15. What are terms of payment when acquiring inputs from these suppliers? E.g. upfront, installments, or payment upon animals sale, etc.
16. In addition to the inputs, do you also receive any advisory services from these input suppliers? If yes, please provide details (e.g. breeds to be reared, vaccination, deworming facility etc.)
17. Who are some of the major suppliers of these inputs and services in your area? E.g. private shops, government extension services, etc. Please provide contact details of some of these suppliers.
18. What are the key management operations performed on an average meat animal's farm in your area?

Operations	No. of Times A Year	Cost of Input (per Application)
Animal breeding		
Vaccination		
Deworming		
Slaughtering		

Others		

### PRODUCTION COST

19. What is the average time span for the raising of cattle as meat animals and average live weight of the animal at the time of slaughtering?
20. What is the average annual expenditure on the production/rearing of cattle as meat animals per animals?
  - a. Water
  - b. Feed ingredients like Grass
  - c. Feed ingredient like grains
  - d. Vaccinations
  - e. Deworming
  - f. Labour
  - g. Other
21. What other major problems do you face with production? E.g. high prices of young calf, feed ingredients, disease attacks, etc.
22. Who is in charge of selling the animal?
23. Are the received payment shared among family members, including women? If yes what is the rate?
24. How do these problems affect the productivity of cattle meat animals raising?
25. Does your area have any progressive cattle meat farmers? If yes, why do you consider them progressive? E.g. use of modern production practices, etc.

### PRODUCTION SUPPORT

26. Do you have access to any government-supported production facilities, e.g. artificial insemination, disease diagnosis lab, extension services, input service centers, etc. If yes, please provide details (e.g. location of the facility, types of products and services you utilize, etc.)
27. What problems do you face in accessing these facilities? E.g. distance, absent staff, limited products or technical capacity, etc.
28. Have cattle meat animal's farmers in your area received production support from any Government agency or donor project etc. over the past five years? If yes, please provide details (e.g. project name and duration, major activities, benefits, etc.)
29. What were some of the challenges faced by you in utilizing the products or services offered by that project?

### MARKETING

30. What are the average number of animals reared by average household?
31. What proportion of the animal does an average household sell for cattle meat?

32. Where is the meat animals mostly sold to? E.g. butchers, contractors, local mandi/market, other district, etc.?
33. In addition to purchasing the animals from you, do these buyers provide any other support to you ? E.g. credit for animal rearing, advice on production, premium for healthy and beautiful animal etc.
34. In what form/ stage the animals are sold? E.g. calf, mature animals, etc.
35. How is the price of the meat animals determined? (e.g. based on your information from mandi or price supplied by the buyer?).
36. Do you perform any functions before selling the produce? E.g. washing, feeding special rations, etc.?
37. How much expense do you make for the additional functions? E.g. washing, feeding special rations, etc.
38. Do you receive a better price if you perform any of the above additional functions? If yes, what is the price premium received by you?
39. What is the average price of the produce per animal (kilo) at different points of the year?
40. What problems do you face in selling animals each type of buyer? E.g. low prices, lack of credit, unavailability of animal during any season, price in festive season etc.
41. What structural problems do you face in marketing your produce? E.g. lack of proper road, cost of transportation, product quality, etc.?
42. Is the produce sold individually or through formation of marketing groups?
43. What current or potential challenges do you see in the formation of marketing groups?
44. Who are the major buyers of cattle meat animals in your area, e.g. butchers, traders, commission agent, etc.? (please provide contact details of some of the important buyers)
45. Have farmers involved in cattle rearing for meat in your area received support (e.g. training, finance, etc.) in marketing of meat animals from any government department or NGO, etc. over the past five years? If yes, please provide details (e.g. project name, duration, type of support provided, benefits accrued)

## LABOUR

46. How many workers does your farm employ for production of the cattle meat animals and what are the functions performed by these individuals?

Production Stage	Number of Laborers	Wages/Person (PKR) Daily or Monthly
Managing feeding inputs like Grass or grain		
Cleanliness		
Milking etc.		

Dormant		
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47. How many of these workers are hired and how many belong to your family?
48. How many of your workers are men and how many are women?
49. What are the major problems faced with labor? E.g. lack of knowledge, non-availability, etc. Please provide details.
50. What are the major functions performed by women in rearing/production, marketing, and value addition of cattle meat animals?

Function	Role of Women
Production	
Marketing	
Value addition	
Other	

#### FINANCE

51. What is the major source of financing for farmers or processing enterprises in your area? E.g. middleman, family and friends, local bank, etc.
52. What is the average amount of loan taken out by a farmer during a year? And what purposes is this loan taken out for?
53. What problems do you face in accessing loans from each of these sources?
54. How have loans from some of these sources helped you in the past? E.g. improving production or marketing, etc.

#### RECOMMENDATIONS

55. In your opinion, what can be done to improve the production and marketing of cattle meat animals in your district?

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN  
QUESTIONNAIRE FOR NEED ASSESSMENT OF CATTLE MEAT VALUE CHAIN IN  
SELECTED DISTRICTS (Peshawar, Abbottabad, Kohistan AND D.I. KHAN),  
KHYBER PAKHTUNKHWA**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Respondent</b>	
<b>Designation</b>	
<b>Directorate</b>	
<b>Contact (mailing address; phones; email address)</b>	
<b>Date</b>	



## QUESTIONNAIRE FOR THE DIRECTORATE OF

### KP Food Safety and Halal Food Authority

#### Organization

1. In which year was this authority established, and what is its technical mandate. (Inspection, standard setting, testing and capacity building etc.)?
2. Exactly what types of services does the authority provide for the benefit of stakeholders involved in cattle meat value chain?
3. What is the legislative text (Act) from which the authority draws its mandate?
4. Are there other organizations / authorities, with which there is a shared responsibility in the level of oversight? How do you qualify this shared responsibility ( be explicit please )
5. Does the authority have any mechanism for coordinating its activities with other technical departments at provincial level as well as at the national level? If yes, please explain.
6. Please provide an organigram of the directorate.
7. What is the number of staff currently engaged by the authority at different levels/grades at provincial and district level in the form of a table:

No.	Position name	Grade	Category (permanent or contractual)	Qualification for post	Experience	Remarks

8. Please provide details of any positions that are lying vacant in the authority:

No.	Position name	Grade	Category (permanent or	Qualification /Criteria for	Date since the position is	Reasons for keeping the position

			<u>contractual</u>	<u>post</u>	<u>vacant</u>	<u>vacant so far</u>

9. How is your authority's situation regarding physical facilities like office space, office equipment and furniture (desk top computers, laptop, printers, photocopying machine, scanning machine, etc.), communication facilities (telephones, etc.), mobility means (vehicles, motorcycles, bikes etc.), generators to back up power outages, air conditioners, heaters, land and materials for inspection, monitoring, analysis, research as well as trainings/demonstrations?
10. Does your staff have access to Internet with reasonable speed, and necessary computer literacy?
11. How are decisions (particularly regulatory ones, whether standards / rules or enforcement) taken
12. Is there an obligation for substantiation of the decision (scientific panel existence, meeting calendar and remuneration etc.), particularly from a science background standpoint
13. Do some decisions require some "vetting" through a committee structure or expert advice and how is that handled.
14. Overall, what is the governance model for decision-making process of KP Food Safety and halal food authority ?

## Gender

15. Does directorate currently have any women staff? If yes, please provide positions occupied by the female staff
16. Do the positions occupied by women are at a scientific / decision-making level?, if yes, then please explain
17. What is the added value brought by women staff? (e.g. easier outreach to women farmers, shopkeepers as well as training)
18. What are some challenges faced by the women staff in performing their duties both within the authority and in the field for inspection?
19. Does the directorate have a woman quota for new staff hires?
20. What issues do you face in the recruitment and retaining of women staff?

## Program Planning

21. Does the department have a program-planning unit?
22. Does the authority has a 5-year strategic plan? If yes, then please share the plan. if at all possible – from which planning is drawn at an annual level
23. Does the authority do an environmental scan conducted to identify emerging issues, stakeholder's issues and concerns *etc.*? if yes then please share the frequency of this scan
24. Does the directorate have a program monitoring evaluation (M&E) unit?
25. How often does directorate conduct program planning meeting (e.g. once a quarter, once a year, as needed *etc.*)?
26. Who participates in these meetings?
27. What are major issues related to program planning discussed in these meetings?
28. What are the benefits of these planning meetings?
29. Does the directorate ever involve farmers, industrialist, food business operators and other stakeholders (e.g. private companies, NGOs, input providers, *etc.*) in program planning meetings?
30. Do you have any suggestions for improving the program planning process

## Staff In-Service Training

31. Does the directorate provide any training regarding food safety to the employees at the time of hiring? If yes, please share the detail of the training with name, course content, duration of training and credit hours for the training
32. Does the authority run an in-service training program regarding food safety or halal for the staff on regular basis? If yes, please provide details:

No	Training Title	Sponsoring agency (federal/provisional Government, PARC, FAO, JICA, USAID, any other etc.)	Training duration	Frequency (e.g. only at time of recruitment, once a year, etc.)	Location and the institution where training is organized	Training methods (e.g. hands on training, lectures in classroom, Exposure industrial Visit, Field Work, any other etc.	Basis of preparing the in-service training program (e.g. because funds have been allocated for this purpose, or because the staff have expressed need for such training, etc.)	Adequate budget allocation specified for in-service training

33. Is this training sufficient to meet the needs of your staff? If no, how can this training be improved? (e.g. in terms of frequency, topics, method of delivery, etc.)

34. When was the last time any staff members of your authority received any training? Please provide details:

No	Training Title	Designations and numbers of the staff trained	Sponsoring institution (e.g. Federal/Provisional Government, PARC, JICA, FAO, USAID, Any other etc.)	Training Duration	Name and location of training institute	Training method (e.g. Hands on training, lectures in classroom, field visit, Industrial visit, etc.)	Resource persons (trainers)

35. How was this training useful for the staff in performing their duties in a better way?

36. What are five critical training needs of your authority staff in order of priority?

37. What will be potential budgetary/financial implications for meeting training needs of your staff?
38. In your thinking, how adequate is food safety technical knowledge and skills of the directorate staff regarding cattle meat value chain?
39. Does the directorate have any food safety training program especially for the butchery shops as well as related stakeholders in cattle meat value chain?
40. Does the KP Food Safety and Halal Food Authority has any course for the butchery shops for the meat cuts preparation, value addition and meat aging. If yes, then share the detail of the training courses?
41. If authority has an objective of helping producers as well as butchers in producing meat from cattle, what type of training would your staff like to receive to achieve objective?
42. If the authority has an objective to help meat processors in improving cattle meat value chain, what type of training your staff would like to receive to achieve the objective?

### **Legislation, Inspection and Testing Facilities**

43. Does the authority applies a risk-based inspection paradigm : i.e. focus resources and attention, based on the risks identified for example based on level of non compliance observed.
44. Does the authority mostly focusing on a strict application of rules or accommodate “accompanying approach to FBOs”, with a stronger emphasis on education and sensitization to sustain the changes in performance of the FBOs and ensure they focus on food safety (inspection culture)
45. Does the authority have legislation for inspection (ante-mortem and post-mortem) of live cattle, slaughtered animal as well as meat produced from these animals? If yes, then kindly share the legislation.
46. Was the authority in-charge for the development of relevant standards on cattle value chain? If yes, please describe the standard-setting process.
47. Does the authority have any inspection criteria for assessing health of cattle meat animals? If yes, then share please.
48. Does the authority have an inspection kit for the meat value chain? If yes, please list the equipment / item, which are used by the inspectors?
49. Does the authority have any Standard operating procedure (SOP) for inspection of cattle meat animals or meat and meat based products? If yes then please share these.
50. Does the authority have any legislation to comply for slaughterhouses, butchery shops as well as meat processing units for developing meat and meat based products? If yes then please share these.
51. Does the authority have any food safety legislation for cattle meat animals, slaughter animal meat and meat products? If yes then please share these

52. Does the authority operate any of following the testing/ research facilities to monitor animals health, inspection, slaughtering, quality, marketing, and value addition (through agro-processing, etc.) which can be linked to the cattle meat value chain:

- i. Testing/Analysis laboratories
- ii. Research stations
- iii. Slaughter house
- iv. Meat Processing unit
- v. Training centers
- vi. Agro-processing, value addition facilities
- vii. Others (Please specify)

53. If yes, please provide the following information for each facility:

No	Type of facility (e.g. testing/ analytical facility, mobile van for monitoring, slaughterhouse, research station):	Location	Major functions	No. of technical staff	Current slaughtering capacity	Potential production	Production quality control and/or certification	Proven benefits to farmers/producers /public (e.g. provision of training through short courses, plants visit, etc.)	Estimated no. of farmers/producer /public that need services	Actual number of farmers/producers /public reached	Suggestions for improvement and their budget	Adequacy of associated budget for operating the facilities

54. Please list the currently available analytical testing equipment and the location where it is used.

55. Please elaborate on the formal training (education, certification or other capacity building capacities) of the laboratory technicians' which use the equipment elaborated in question 41.

### **Organization**

56. How many extension staff are based in each districts (Peshawar, Abbotabad, Kohistan and D.I. Khan), and how many of them are women?

57. Do all staff have their Terms of Reference (job descriptions)? If yes, give samples of the Terms of Reference of two extension staff, one at the directorate, and the other in the district.

58. How many times in a year directorate and district staff have joint meetings, and for what purposes?

59. Does the directorate have adequate human resources? If not, please explain what type of additional staff is needed, and if necessary budget is available for their recruitment.

60. How adequate are your physical resources at directorate including office space, office furnishing, equipment and machines (desk top computers, lap top computers, printers,



photocopying and scanning machines, etc.), communication facilities, transportation facilities (give number of vehicles, motorcycles, bikes etc.), land for demonstrations and experimentation, farm equipment for demonstrations and training of farmers, adequate budget for field operations, etc.

61. Does your authority collaborate with third-party (other departments or private sector service provider) to deliver services relevant for the cattle value chain? Please elaborate.

### **Program Planning, Monitoring and Evaluation, Impact Assessment**

62. What is the process of preparing annual monitoring, inspection and evaluation program (work plan and budget), followed by the directorate?
63. How are food safety work plans and budget prepared at the district offices?
64. Is there any mechanism used by the field extension workers to actively involve men and women farmers in preparing food safety implementation work plans for a specific period (e.g. annual, every six months, quarterly, etc.)
65. Do the field food safety officers help men and women farmers/manufacturer/food producers groups for food safety program planning purposes?
66. Is implementation of food safety plans monitored by the district staff, headquarter staff and beneficiary food business groups or individual farmers?
67. Do food safety authority and/or district offices evaluate the implementation plan, in collaboration with the beneficiary food operators, businessmen and farmers, to see to what extent the plan's targets have been achieved?
68. Has the socio-economic and environmental impact of food safety program ever been assessed by the authority's extension staff in collaboration with the beneficiary stakeholders?

### **Food safety Approach, Methods and Materials**

69. Does the food safety officers/staff follow any particular approach/model (e.g. food safety model, risk-based inspection, analysis approach, rapid tool kits, Training & Visit System, Participatory Group Approach, Top-down Approach, Bottom-up Approach, Demand-driven Approach, etc.)?
70. Which inspection methods are frequently followed by the food safety officers/ staff (e.g. raid/visits to individual farmers in field or at home, visits to food processing premises, extension and outreach activity, producers/ food handlers training, any application for monitoring of food safety, etc.)?
71. What are the potential consequences of these inspections in case of different level of non-conformities?
72. Do you have established curricula with training-of-trainer guides for food safety trainings? If yes please share the copies with us.

73. Does directorate or district staff regularly develop food safety literature and other materials targeted for food producers, food handlers, farmers for improving the safety and quality of cattle meat available for the consumers, etc.? If yes, please provide list of publications and materials that are most popular among the relevant stakeholders.
74. Does directorate have adequate budget and human resources for preparation of food safety related materials and publications?
75. Does directorate or the district extension office organize training courses for farmers, meat animal's handlers, Food operators and food handlers regarding food safety involved in cattle rearing for meat purpose on regular basis? If yes, please provide details

### **Inter-Directorate Coordination**

76. How does the KP food safety and halal food authority directorate coordinate its programs and field activities with other technical directorates like Department of Agriculture, Department of Livestock and dairy development department?
77. How many times the authority staff and meet the staff of the Department of Agriculture or Livestock and Dairy development department in a year?
78. Do technical subject-matter specialists/researchers accompany extension workers for while visiting farmers in their fields for trouble shooting or for program planning purposes?
79. Are you satisfied with the present coordination and communication between food safety authority staff and researchers/subject-matter specialists based at Directorate of livestock and dairy development department, or based elsewhere? If not then give suggestions for improvement.

### **Involvement of Non-government Actors**

80. Which specific non-government actors, in your opinion, are engaged in food safety work regarding cattle meat value chain in KP?
81. How happy are the farmers/producers, in your opinion, with extension/food safety activities undertaken by the non-government actors in improving the cattle meat value chain in KP?
82. Does the food safety authority directorate or district food safety offices or field workers collaborate with non-government actors in any way for benefit to meat animal's producers, butchers or meat processors?
83. Are you aware of any non-government food safety service providers who charge fee from farmers, butchery shops, food processors for their technical advice?
84. Do any of non-government actors/agencies/donors or their projects provide any assistance for developing food safety capacity of directorate? Please give specific information on major assistance activities.

85. In your opinion, which non-government service providers should be encouraged to get involved in the delivery of food safety services to the farmers, butchery shops as well as meat processors for value addition?

### **Constraints**

86. Please give a list of constraints (e.g. lack of technical knowhow, inadequate budget for field inspection operations, a lack of transport facilities, lack of incentives, absence of a career development path, etc.), faced by the food safety staff at various levels in authority while performing their duties, and give suggestions how to remove those constraints.

### **Specific Training Needs**

87. What are major problems confronted by cattle meat animal's producers, butchers, meat processors in the production and marketing of cattle meat animals?
88. What actions has the directorate taken during the past two years to address these problems?
89. Were any of these actions taken in collaboration with the projects funded by various donor agencies such as FAO, ASF, JICA and USAID *etc.*?
90. Specify training needs of the headquarter, district and field level food safety staff for providing effective inspection, monitoring and extension support to producers/farmers/butchers/ meat processors/ other actors involved in production, processing and value addition of cattle meat value chain.

**AGRI-FOOD AND AGRO-INDUSTRY DEVELOPMENT ASSISTANCE PAKISTAN  
QUESTIONNAIRE FOR NEED ASSESSMENT OF CATTLE MEAT VALUE CHAIN IN  
SELECTED DISTRICTS (Peshawar, Abbottabad, Kohistan AND D.I. KHAN),  
KHYBER PAKHTUNKHWA**

<b>Name of District</b>	
<b>Name of Tehsil</b>	
<b>Name of Respondent</b>	
<b>Designation</b>	
<b>Directorate</b>	
<b>Contact (mailing address; phones; email address)</b>	
<b>Date</b>	

## QUESTIONNAIRE FOR THE DIRECTORATE OF

### Department of Agriculture Livestock & Dairy Development Department (Extension)

#### Organization

1. Which year was this directorate established in, and what is its technical mandate?
2. Exactly what types of services does the directorate provide for the benefit of farmers?
3. Does the directorate have any mechanism for coordinating its activities with other technical directorates in the department? If yes, please explain.
4. Does directorate staff perform any direct field duties beyond what Directorate of Livestock & dairy development performs?
5. Please provide an organogram of the directorate.
6. What is the number of staff currently engaged by the directorate at different levels/grades at provincial and district level:
  - i. Position
  - ii. Grade
  - iii. Formal education (e.g. matric, B.Sc., DVM, M.Sc., MPhil, Ph.D non-degree diploma, in-service training, and length of experience)
  - iv. Gender (male or female)
7. Please provide a list of vacant positions at the Directorate.
8. Please share detail of testing capacities and toolkits departments have for compliance in the KPK province

Facilities	
1. Testing facilities	
2. Toolkits for monitoring animal health	
3. Others if any	

#### Gender

9. Does directorate currently have any women staff? If yes, please provide positions occupied by the female staff
10. What is the added value brought by women staff? (e.g. easier outreach to women farmers)

11. What are some challenges faced by the women staff in performing their duties both within the directorate and in the field?
12. Does the directorate have a woman quota for new staff hires?
13. What issues do you face in the recruitment and retaining of women staff?

### **Program Planning**

14. Does the department have a program-planning unit?
15. Does the directorate have a program monitoring evaluation (M&E) unit?
16. How often does directorate conduct program planning meeting (e.g. once a quarter, once a year, as needed etc.)?
17. Who participates in these meetings?
18. What are major issues related to program planning discussed in these meetings?
19. What are the benefits of these planning meetings?
20. Does the directorate ever involve farmers and other stakeholders (e.g. private companies, NGOs, input providers, etc.) in the program planning meetings?
21. Do you have any suggestions for improving the program planning process

### **Staff In-Service Training**

22. Does the directorate run an in-service training program for the staff on regular basis? If yes, please provide details:
  - i. Titles or topics of the training
  - ii. Name of sponsoring and or funding organization (e.g. federal/provisional Government, PARC, JICA, etc.)
  - iii. Duration
  - iv. Frequency (e.g. only at time of recruitment, once a year, etc.)
  - v. Location and the institution where training is organized
  - vi. Training methods (e.g. hands on training, lectures in classroom, Exposure Visit, Field Work, etc.
  - vii. Basis of preparing the in-service training program (e.g. because funds have been allocated for this purpose, or because the staff have expressed need for such training, etc.)
  - viii. Adequate budget allocation specified for in-service training
23. Is this training sufficient to meet the needs of your staff? If no, how can this training be improved? (e.g. in terms of frequency, topics, method of delivery, etc.)
24. When was the last time any staff members of your directorate received any training? Please provide details:



- i. Titles or topics of training
  - ii. Designations and numbers of the staff trained
  - iii. Name of sponsoring or funding institution (e.g. Federal/Provisional Government, PARC, JICA, etc.)
  - iv. Duration
  - v. Name and location of training institute
  - vi. Training method (e.g. Hands on training, lectures in classroom, field visit, study tour, practical field work, etc.)
  - vii. Training resource persons (trainers)
25. How was this training useful for the staff in performing their duties in a better way?
26. What are five critical training needs of your directorate staff in order of priority?
27. What will be potential budgetary/financial implications for meeting training needs of your staff?
28. In your thinking, how adequate is technical knowledge and skills of the directorate staff regarding cattle meat chain and value addition in areas of agriculture and livestock?
29. If the directorate has an objective of helping farmers/producers in producing quality meat from cattle, what type of training would your staff like to receive to achieve the objective?
30. If the directorate has an objective to help agro-processors in improving value chains of cattle meat, what type of training your staff would like to receive to achieve the objective?
31. Please give your suggestions for improving the in-service training program.

### **Research and Production Facilities**

32. Does the directorate operate any of following research and/or production facilities to promote production, slaughtering & inspection, marketing, and value addition (through agro-processing, etc.) of cattle meat:
- i. Research stations
  - ii. Slaughter house
  - iii. Meat Processing unit
  - iv. Testing/Analysis laboratories
  - v. Training centers
  - vi. Agro-processing, value addition facilities
  - vii. Others (Please specify)
33. If yes, please provide the following information for each facility:
- a. Type of facility (e.g. slaughterhouse, research station):
  - b. Location
  - c. Major functions
  - d. Number of technical staff
  - e. Current slaughtering capacity

- f. Potential production
- g. Production quality control and/or certification
- h. Proven benefits to farmers/producers/public (e.g. provision of training through short courses, plants visit, etc.)
- i. Estimated number of farmers/member of public that need services
- j. Actual number of farmers/producers/public reached
- k. Suggestions for improvement and their budgetary implications
- l. Adequacy of associated budget for operating the facilities

### **Organization**

- 34. How many technical and administrative staff does the directorate headquarter have, what are their individual specializations as well as gender?
- 35. What are formal educational qualifications and years of experience of each headquarter staff member?
- 36. How many extension staff are based in each districts (Peshawar, Abbotabad, Kohistan and D.I. Khan), and how many of them are women?
- 37. How many times in a year the directorate and district staff have joint meetings, and for what purposes?
- 38. Does the directorate have adequate human resources? If not, please explain what type of additional staff is needed, and if necessary budget is available for their recruitment.
- 39. How adequate are your physical resources at the directorate including office space, office furnishing, equipment and machines (desk top computers, lap top computers, printers, photocopying and scanning machines, etc.), communication facilities, transportation facilities (give number of vehicles, motorcycles, bikes, horses, etc.), land for demonstrations and experimentation, farm equipment for demonstrations and training of farmers, adequate budget for field operations, etc.

### **Program Planning, Monitoring and Evaluation, Impact Assessment**

- 40. What is the process of preparing annual extension program (work plan and budget), followed by the directorate?
- 41. How are extension work plans and budget prepared at the district extension offices?
- 42. Is there any mechanism used by the field extension workers to actively involve men and women producers/farmers in preparing extension work plans for a specific period (e.g. annual, every six months, quarterly, etc.)
- 43. Do the field extension workers help men and women farmers' groups for extension program planning purposes?

44. Is implementation of extension plans monitored by the district staff, headquarter staff and beneficiary farmers' groups or individual farmers?
45. Do extension directorate and/or district extension offices evaluate the plan implementation, in collaboration with the beneficiary farmers, to see to what extent the plan's targets have been achieved?
46. Has the socio-economic and environmental impact of extension program ever been assessed by the extension staff in collaboration with the beneficiary farmers?

#### **Extension Approach, Methods and Materials**

47. Does the extension staff follow any particular approach/model (e.g. Farmer Field School, Training & Visit System, Participatory Group Approach, Top-down Approach, Bottom-up Approach, Demand-driven Approach, etc.)?
48. Which field extension methods are frequently followed by the extension workers (e.g. visits to individual farmers in field or at home, visits to groups of men and women farmers, method and result demonstrations, farmer days, exhibitions & shows focusing on particular commodities or agricultural equipment or farm inputs, contacts with farmers through mobile phones, etc.)?
49. Does directorate or district staff regularly develop extension literature and other materials targeted at farmers containing extension advice and guidance such as on animal selection, breeds of animals for rearing, feed and water requirement of animal, diseases diagnosis, vaccination program, disease prevalence, slaughtering, inspection and marketing, etc.? If yes, please provide a list of publications and materials that are most popular among the farmers.
50. Does directorate have adequate budget and human resources for preparation of extension publications and materials?
51. Does directorate or the district extension office organize short training courses for men and women farmers involved in cattle rearing for meat purpose on regular basis? If yes, please provide details

### **Inter-Directorate Coordination**

52. How does the extension directorate coordinate its programs and field activities with other technical directorates like KP food safety and Halal food authority?
53. How many times the extension directorate staff and provincial extension staff meet the staff of the Agricultural Research Directorate in a year?
54. Do technical subject-matter specialists/researchers accompany extension workers for while visiting farmers in their fields for trouble shooting or for program planning purposes?
55. Are you satisfied with the present coordination and communication between extension staff and with researchers/subject-matter specialists based at Directorate of Agricultural office, or based elsewhere? If not then give suggestions for improvement.

### **Involvement of Non-government Actors**

56. Which specific non-government actors, in your opinion, are engaged in extension work regarding cattle value chain in KP?
57. Does the extension directorate or district extension offices or field extension workers collaborate with non-government actors in any way for benefit to the farmers?
58. Are you aware of any non-government extension service providers who charge fee from farmers for their technical advice?
59. Do any of non-government actors/agencies/donors or their projects provide any assistance for developing capacity of directorate? Please give specific information on major assistance activities.
60. In your opinion, which non-government service providers should be encouraged to get involved in the delivery of extension services to the farmers?

### **Constraints**

61. Please give a list of constraints (e.g. lack of technical knowhow, inadequate budget for field operations, a lack of transport facilities, lack of incentives, absence of a career development path, etc.), faced by the extension staff at various levels while performing their duties, and give suggestions how to remove those constraints.

### **Specific Training Needs**

62. What are major problems confronted by farmers/producers in the production and marketing of cattle meat animals?
63. What actions has the directorate taken during the past five years to address these problems?

64. What actions are under consideration by the Department to address the needs of the cattle value chain?
65. Were any of these actions taken in collaboration with the projects funded by various donor agencies such as FAO, ASF, JICA and USAID *etc.*?
66. Specify training needs of the headquarter, district and field level extension staff for providing effective extension support to the producers/farmers/other actors involved in the production and/or operating cattle meat value chain.

**ANNEX 03****FIELD PLAN OF THE ASSIGNMENT**

Day	Date	Time	Activity
Wednesday	27 November, 2019	08: 00 hrs	Departure from Islamabad
		10:00 hrs	Meeting with Secretary Agriculture, KPK, Pakistan
		12:00 hrs	Meeting with Director General, Livestock and Dairy development department (Extension), KPK, Pakistan
Thursday	28 November, 2019	09:00 hrs	Meeting with Director General, KP Food Safety and Halal food Authority, KPK, Pakistan
		12:00 hrs	Visit of the slaughterhouse, Munir Meat Company as well as butchery shops in Peshawar
		03:30 hrs	Meeting with representative of the Bank of Khyber, Peshawar, Pakistan
Friday	29 November, 2019	10: 00 hrs	Departure from Peshawar for Islamabad
		12: 00 hrs	Meeting with representatives of Metro Cash and Carry at Metro Islamabad store
Monday	20 January, 2020	07: 30 hrs	Departure from Islamabad
		11:00 hrs	Meeting with representative of Shaheen chemist survey and questionnaire filling
		12:00 hrs	Meeting with representative of Continental meat store survey and questionnaire filling
		14:00 hrs	Meeting with representative of Wadood Sons survey and questionnaire filling
		15: 30 hrs	Meeting with representative of Al-fatah store survey and questionnaire filling
		17: 00 hrs	Meeting with representative of Walmart survey and questionnaire filling
		18:00 hrs	Meeting with representative of city hyperstar survey and questionnaire filling
Tuesday	21 January,	10: 00 hrs	Meeting with meat exporters representative Munir and Co Meat company survey and questionnaire filling



	2020	13: 00 hrs	Meeting with meat exporters representative Hamza Haalal food survey and questionnaire filling
Wednesday	22 January, 2020	10:00 hrs	Seminar on Model food business with theme safe food healthy peoples being organized by with KP food Safety and Halal food authority
		13:00 hrs	Meeting with KP food Safety and Halal food authority representatives for survey and questionnaire filling
Thursday	23 January, 2020	10: 00 hrs	Meeting with representatives of Livestock and dairy development department at directorate office, Peshawar
		01:30 hrs	Meeting with representatives of butchery association at Livestock and dairy development department at directorate office, Peshawar
		15: 00 hrs	Meeting with representatives of farmers association at Livestock and dairy development department at directorate office, Peshawar
Friday	24 January, 2020	09:00 hrs	Meeting with representatives of different butchery shops in different shops in Peshawar
		15: 00 hrs	Departure from Peshawar to Islamabad

## PRE-FEASIBILITY OF MODEL MEAT SHOP

The proposed model meat shop (capacity 500kg meat/day) will work as a modern butchery shop operating as per compliance of food safety which will set footprints to follow in KP province for improving food safety compliance by rest of butchery shops for provision of safe meat to the consumers. Currently, butchery shops in the KP do not comply basic food safety regulations due to lack of butcher's knowledge & skills and mostly fresh meat sold is exposed to open environment that is one of major reason for breach of food safety. Therefore, there is a need to establish a model meat shop that will guide the butchers to meet the basic hygiene and safety requirement for the meat.

## 1. Required Features for establishment of model meat shop

## 1.1 Strategically located

The butchery shops be established preferably in metropolitan city area with upper middle class and higher lower middle class income group population due to accessibility, affordability and knowledge of the peoples regarding food safety. Also, meat is one of the expensive food commodity so establishing the meat shop in high income group people is recommended.

## 1.2 Size including open space

The space requirement for proposed meat shop is 544 square feet (2 Marla) considering the space for display (272 square feet for meat display with monthly rent ranged 20,000-50,000 per month), 272 square feet for meat slicing & cutting and office storage (Table 1).

**Table 1. Cost of model meat shop including Land & building infrastructure, machinery, furniture & fixture and recurring cost**

No.	Description	Amount in Pak. Rupees
01	Meat shop monthly rent (with approximate range around 20000-50000 depending on location)	30000
02	Building & Infrastructure	380800
03	Machinery for meat shop	853900
04	Furniture & Fixture	532500
05	Recurring cost including salaries per month	128000
<b>Grand total</b>		<b>1925200/-</b>

**Table 1.1. Building and Infrastructure**

Description	Required Area	Unit Cost in Pak Rupees	Expected Cost in Pak Rupees
Renovation work including sign board development	544 square feet	700	380800
<b>Total</b>			<b>380800/-</b>

## 1.3. Machinery for the meat shops

The details of machinery required and furniture along with fixture for model meat shop are given as (Table 1.2).

**Table 1.2 Machinery for model meat shop**

No.	Machinery	Quantity	Expected Cost	Total
1	Meat Cutting set including butchery knives and cutting board	3	10000	30000
2	Bone cutting machine	1	64000	64000
3	Meat slicer machine	1	300,000	300000
4	Meat Mincing machine	1	60,000	60000
5	Meat Wrapping Machine	1	40,000	40000
6	Electronic weighing scale with printing	1	15000	15000
7	Display Freezer (6ft)	1	225000	225000
8	Deep Freezers	1	62900	62900
9	Display Meat trays	30	200	6000
11	Packaging Trays (1000 each) including 250g, 500g and 1000g	3000	15	45000
12	Insect killer	1	3000	3000
13	Thermometer	2	1000	2000
14	Exhaust fan	1	1000	1000
<b>Total</b>				<b>853900</b>

**Table 1.3. Furniture & Fixtures for the model meat shop**

No.	Furniture & Fixtures	Quantity	Expected Cost	Total
1	Executive chair for manager	1	8000	8000
2	Office Tables	1	12500	12500
3	Office Chairs	3	4000	12000
4	Working table with Teflon sheet/stone shelves	2	40000	80000
5	Desktop Computer	1	65000	65000
6	AC Inverter (2 tons)	2	80000	160000
7	Solar system	1	150000	150000
8	Safety dress code including uniform set and working utilities like aprons, gloves, face masks, hair caps & nets, shoe covers and Beard masks	3	15000	45000
<b>Total</b>				<b>532500</b>

### 3. Production Scope of model meat shop

The proposed hygienic meat shop with food safety compliance will attract large number of consumers as people now demand safe and quality meat because food safety awareness level of these peoples has increased in last couple of years. The main success factor in developing model meat shop is consumer confidence that are interested to purchase safe and healthy meat in market.

### 3.1 Processing capacity of unit

The shop having meat cutting facilities as per the requirements of food safety compliance a capacity to sale 500 kg safe and quality meat on daily basis.

### 3.2 Staff

The project is supposed to provide employment to some 5 people directly, however, semi-skilled butchers would also be required and their number depends on the capacity of the meat shop if increased.

### 3.3 Equipment supply

The machinery needed for meat shop will be procured from local stores by consulting the reputable suppliers like in the market.

### 3.4 Processing capacity of meat shop

The shop having meat cutting facilities as per compliance of food safety requirements with initial capacity to sale 500kg safe and quality meat on daily basis whereas, this capacity can be increased to 1000kg/day depending on the increase in the demand.

### 3.5. Human resource/Staff for meat shop

Please see at section 1.4

**Table 1.4. Human Resources for meat shop with number and expected salary**

No	Human Resource	Employees	Expected Salary (PK) per person	Total cost
01	Owner/Manager	1	50,000	50000
02	Butchers	3	20,000	60000
03	Cleaning Staff	1	18,000	18000
Total				128000

## 5. Sensitivity indicators

### 5.1 Attracting small butchery shops holders

According to butchery association of Khyber Pakhtunkhwa province, Peshawar city has approximately 2,500-3,000 butchery shops, Abbottabad around 1000-1200 meat shops, D.I Khan 100-120 meat shops and Kohistan 15-20 meat shops that are providing meat to consumers. Unfortunately, the meat shops lack food safety compliance and some even lack the access to the facilities like water and electricity. These shops are the last link of the supply chain that provides edible part of the animal carcass for the consumers and consumption of unsafe meat can result the food borne illness in the peoples. The butchery shops range from very small (selling around 100 kg meat/day) to the large (sell around 2000kg meat/day) but none of the butchery shop comply food safety practices and international best practices due to lack of knowledge and skills. The shop will sell with bone, meat mince, boneless and carcasses to the consumers by following the guidelines of food safety that will also encourage other butchery shops for the provision of safe meat to the consumers. Also, the lack of food preservation technologies like refrigeration, freezing and packaging will also reduce the post- harvest loss and any waste of this valuable food commodity.

## 5.2. Meat Suppliers

The livestock sector provides food of animal origin to population of more than 35.53 million people of which 82% are rural dwellers having great dependence on agriculture and livestock. The province produced 580.410 ton meat annually and majority farmers (>90%) in KP involved in livestock production are rearing animals as subsistence farming. They are producing meat animals for the butchery shops and they can earn a good amount by connecting these farmers' meat animals to high end local and export markets. The major constraints in these supply chain development is lack of food safety compliance and in this regard the development of meat shop model for the safety compliance will encourage other suppliers to enable cattle meat apple producers to add value to their products and sale to the high end market by compliance of food safety.

## 5.2 Price fluctuations

The price information given in the below given table shows the average cattle meat price in Peshawar market. The average price per kilogram is around Rs. 420 during the year 2019 (Figure 1). The meat prices are mainly regulated by the local government that is also one of the major hurdle in developing the competitive market on supply and demand basis so price decapping can help the development of the food safety compliance of the butchery shops in the province.

**Table 1. Price of fresh cattle meat at butchery shops, meat stores and export market**

Local government rate for fresh meat with bone	Fresh meat with bone retail price at butchery shops	Fresh meat with bone price at meat stores	Export market rate of fresh meat for Afghanistan
Rs. 440/kg	Rs. 440-480/kg	Rs. 450-550/kg	\$ 3.50-4.5/kg of meat

## 5.3 Maintaining standards

Presently, the butchery shops are not complying the food safety practices as the supply chain is not following the good hygiene practices (GHP), good manufacturing practices (GMP) and Hazard Analysis and Critical Control Point (HACCP) that are considering basic food safety standard in the world. Pakistan is one of world best quality producer of halal meat but the potential is not achieved due to non-compliance of food safety issues. The butchery shops are not even ready to meet the basic food safety standard mainly owing to lack of knowledge and weak regulatory framework of Pakistani standards whereas, it is very far away to meet the international standards that are one of the major hurdle for meat export. The compliance of food safety standards need to be improved as per the requirements of the international market and to make a place in the international market. In this regard, fulfilling the World Trade Organization's (WTO), Sanitary and Phytosanitary standards (SPS) measures, Halal requirements and ISO 22000 are prerequisite for exports.

## 5.4 Exchange rate fluctuation

The exchange rate of Pakistani rupee is quite stable for last couple of months after a volatile period of approximate six months in reign of present government. The price regulation and exchange rate overall affect the business and indicate the purchasing price of the meat. Meat being a valuable commodity is largely purchased by consumers of upper and lower middle class. Also, the exchange rate fluctuation mainly influence the imports and exports of the food commodities and locally it also indicate the buying power by influencing the business of the

peoples. Price fluctuation depending on animal price and market price on fest days as well as government regulations.

### **5.5 Increasing competition and other factors**

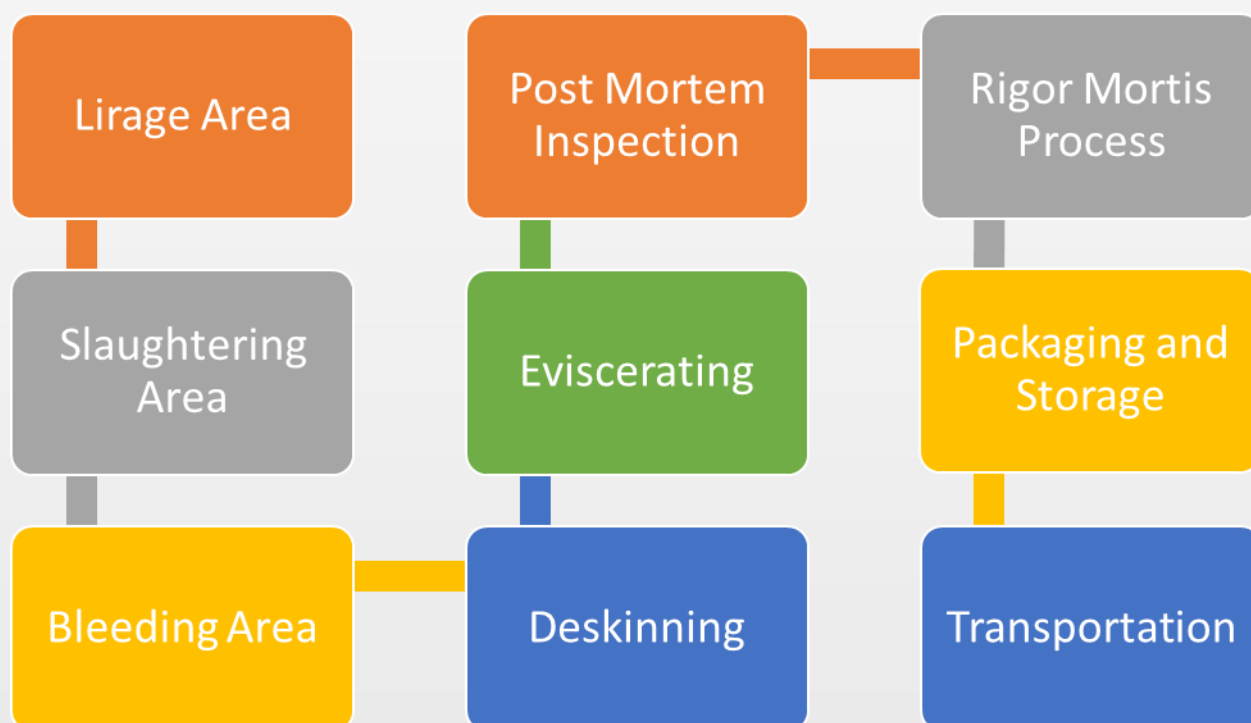
One of the important reasons for non-establishment of meat shops with capacity to comply food safety requirement in KP province are lack of knowledge and training of butchers, weak regulatory framework and price decapping from local government. Similarly, training butchers regarding food safety compliance and price decapping will increase competition considering the quality and safety aspects of fresh cattle meat sold to the consumers that will further improve food safety compliance of butchery shops in the province.

### **References**

- Trade and Markets Division. (2013) Food outlook: Biannual report on global food markets. Published by Food and Agriculture organization (FAO). pp. 139
- Pre-Feasibility Study Meat Shop. 2017. Small and Medium Enterprises Development Authority, Ministry of Industries & Production, Government of Pakistan

## PRE-FEASIBILITY OF COMMERCIAL SLAUGHTERHOUSE

The proposed slaughterhouse (500 animals with average carcass weight 120kg per day) will work for animal slaughtering, deskinning and carcass of animals and handle animal waste generated in a process that can comply food safety requirement. Currently, slaughterhouses operating in KP province are in very bad condition and do not comply food safety regulations due to lack of knowledge and skills and is one of the major hurdle for the export of meat. The literature showed that following steps are usually involved in the provision of meat carcass in the slaughterhouse for producing safe meat carcass for butchery shops, food service sector, meat stores, hypermarkets, meat processors and meat exporters.



**Figure 1. Flow line of different operations involved in slaughtering of meat animals**

### **1. Required Features for establishment of slaughterhouse**

#### **1.1 Strategic location**

The meat slaughterhouse can be established preferably in suitable area that is connected by main roads and basic facilities are easily available there. It will be outside the residential area away from Industrial zone due to accessibility, existence of the necessary logistic facilities, human resource, operational business activities and knowledge of peoples regarding food safety.

#### **1.2 Size including open space**

The space requirement for the proposed slaughterhouse is 34588 square feet considering various facilities including lairage facility for animals, hall for slaughtering of animals, raw material storage, staff washrooms, cold storage area, pavement, cafeteria, duty staff accommodation and



ground/boundary wall (Table 1). It is suggested that for efficient working of slaughterhouse, this facility be run by partnership with local investor that will provide land and contribute to the building cost as well, their share depend on project policy. However, if land is to be acquired than the prevailing lease rate per ft<sup>2</sup> is around Rs. 1600 in suburbs of various areas in KP province (Table 1).

### 1.3. Slaughtering line

The automatic slaughtering line for meat animals detail is in table 1.2.

**1.4 Office:** see section 1.3. and 1.4

**Table 1. Project Cost for establishing slaughterhouse**

No.	Description	Amount in Pak Rupees
01	Building & Infrastructure	28188800
02	Machinery for slaughterhouse	80600000
03	Furniture & Fixture	1470000
04	Office Equipment	759000
05	Human resource expenses (Monthly)	1,007,000
<b>Grand total</b>		<b>112,024,800</b>

## 2. Required resources for operationalization

### 2.1 Building

The civil works divided into sections including lairage facility for animals, Hall for slaughtering of animals, storage areas, Storage location for raw material and cold storage, Staff accommodation & washrooms and land cost is not included in the feasibility as it varies. However, the land acquisition from the government on lease is one of the best possibility for the land of the slaughterhouse. The cost of construction per ft<sup>2</sup> for hall for slaughtering is estimated to be Rs. 2000 per square feet, cold storage area Rs. 3100 per square feet and lairage facility for animals is estimated Rs. 1500 square feet at current market rate. The details of space requirement and cost related to land & building are given in table 1.1.

**Table 1.1. Building & Infrastructure**

No.	Description	Expected area (Square feet)	Unit Cost in Pak Rupees	Total Cost in Pak Rupees
1	Lairage facility for animals	4000	1500	6000000
2	Hall for slaughtering of animals	4500	2,000	9000000
3	Raw Material Storage	1200	1,600	1920000
5	Cold Storage Area	1088	3100	3372800
6	Pavement/Driveway	4500	600	2700000
7	Cafeteria	600	2100	1260000
8	Duty Staff Accommodation and washroom	900	2000	1800000
9	Ground/Boundary wall	17800	120	2136000
	<b>Total Area</b>	<b>34588</b>		<b>28,188,800</b>

**Table 1.2. Machinery for slaughterhouse**

No.	Machinery needed	Quantity	Unit cost in Pak Rupees	Total Cost in Pak Rupees
1	Automatic slaughtering line	1	55000000	55000000
2	Cold Storage Room	1	6,500,000	6500000
3	Meat Packaging Line	1	4,500,000	4500000
4	Refrigerated Vehicle	2	5,800,000	11600000
5	Generator	1	1500000	1500000
6	Tube well for water supply	1	250000	250000
7	Miscellaneous	1	1250000	1250000
<b>Total</b>				<b>80600000</b>

**Table 1.3. Furniture & Fixture**

No	Description	Quantity	Unit Cost	Total Cost
1	Furniture	1	200000	200000
2	Electrical wire & Lights	1	950000	950000
3	Air Conditioner Inverter (1.5 ton)	4	80000	320000
<b>Total</b>				<b>1470000</b>

**Table 1.4. Office Equipment**

No	Human Resource	No. of Employees	Expected unit Cost in Pak Rupees	Total Cost in Pak Rupees
1	Desktop Computers	2	65000	130000
2	Computer Printers	2	22000	44000
3	Network Cost	1	200000	200000
4	Multimedia	1	80000	80000
5	Telephones	5	3000	15000
6	Telephone exchange	1	120000	120000
7	Fax machine	1	45000	45000
8	Photocopier	1	125000	125000
<b>Total</b>				<b>759,000</b>

**Table 1.5. Human Resource**

No	Human Resource	No. of Employees	Expected Salary (PKR)	Total Cost
1	Owner/Manager/CEO	1	150,000	150,000
2	Admin Officer	2	29,000	58,000
3	Cleaning Staff	5	18000	90,000
4	Veterinary Doctor	1	60000	60,000
5	Veterinary Assistant	1	25000	25,000
6	Butchers	10	30000	300,000

7	Helpers to Butchers	10	18000	180,000
8	Marketing Manager	1	50000	50,000
9	Account Officer /Cashier	1	30,000	30,000
10	Security Guard	1	20,000	20,000
11	Drivers	2	22,000	44,000
<b>Total</b>				<b>1,007,000</b>

### 3. Production Scope of the slaughterhouse

The slaughterhouse is one of the major facility in the cattle value chain that is intended to slaughter animals and mostly the facilities in KP province lack food safety compliance and establishing slaughterhouse facility with proper food safety compliance is needed. Modern regulations also force the animal slaughtering could only be practiced in these designated slaughterhouse with the ban on open slaughtering so this situation really demand the establishment of the slaughterhouse with food safety compliance for providing slaughtering facility to the butchers, food processors and for export purpose. The major critical considerations for establishment of slaughterhouse facility are location of the facility, lairage facility/capacity, safe disposal of condemned carcass, safe disposal of waste, maintenance of good Hygiene in premises and prevention of disease.

#### 3.1 Processing capacity of unit

The slaughterhouse having animal slaughtering, deskinning, waste removal & disposal as well as carcass cutting and packaging facility as per requirements of food safety compliance of 500 animals with average carcass of 120 kg on daily basis that is extendable for 1000 animals per day depending on the requirement of the slaughtering animals.

#### 3.2 Staff

The project is supposed to provide employment to 35 people directly, however, semi-skilled butchers would also be required and their number depends on the capacity of slaughterhouse if increased. Also, the number of farmers and the middle men engaged in these activities will be in hundreds that will benefit from this facility.

#### 3.3 Equipment supply

Automatic slaughtering line will be imported either from Japan/Italy/China depend on the price and quality of the machinery. The slaughtering line with specifications (slaughtering box, hanging line) will be imported after consultation with the experts and the supply and demand side cattle meat animals.

#### 3.4 Slaughtering capacity of facility

The slaughtering capacity of this slaughterhouse by meeting the food safety compliance initially is 500 animals with average carcass weight 120 kg on daily basis that is extendable up to 1000 animals per day that is extendable for 1000 animals per day depending on the requirement of the slaughtering animals.

#### 3.5. Human resource/Staff slaughterhouse

Please see at section 1.5

## 5. Sensitivity indicators

### 5.1 Attracting small farmers and butchers

Livestock is one of the major contributor in agriculture of KP province and has potential for the growth and development of livestock particularly of cattle meat animals due to presence of natural resources and meat preferences by locals. Majority farmers (>90%) in KP are involved in livestock production include animal rearing that need to be slaughtered to become the part of meat supply for human consumption. According the recent regulations and to meet the food safety compliance, the street slaughtering is not allowed and only the animals can be slaughtered in the designated facilities of the animals slaughtering. Also, the major requirement for halal and tayyab production is animal type, slaughtering procedure and safety compliance so slaughterhouse facility can be established. This facility will connect the farmers, butchers, wholesale dealers, meat stores, Cash & Carries and Exporters for their animal slaughtering, deskinning, waste removal and packaging the carcass or carcass parts. The slaughterhouse facility will attract farmers and butchers by following the guidelines of food safety that will also encourage other butchery shops for the provision of safe meat to the consumers.

### 5.2 Meat Suppliers

The livestock sector provides food of animal origin to population of more than 35.53 million people of which 82% are rural dwellers having great dependence on agriculture and livestock. The province produced 580.410 ton meat annually and majority farmers (>90%) in KP involved in livestock production are rearing animals as subsistence farming. They are producing meat animals for the butchers, meat stores, food service sector and international market so connecting them with this facility of animal slaughtering through food safety compliance can earn good amount by meeting local demand as well as through increase export markets. The major constraints cattle meat supply chain development in Pakistan is lack of food safety compliance and majority export markets are not giving us access for safety compliance so this slaughtering facility will encourage other stakeholders to enable cattle meat producers to add value to their products and sale to the high end market by compliance of food safety.

### 5.3 Price fluctuations

The price information given in below table show average fresh cattle meat price in KP province as well as for export market. The average price per kilogram of meat for local market varies from Rs. 420-550 during the year 2019 in different meat shops, meat stores as well as hypermarkets (Figure 1) whereas, the price for the export varies from \$3.5 to 4.5/kg meat. The meat prices for local are mainly regulated by district government whereas, the Pakistani meat exporters mainly have access to low end export markets like Afghanistan due to food safety compliance.

**Table 1. Price of fresh cattle meat at butchery shops, meat stores and export market**

Local government rate for fresh meat with bone	Fresh meat with bone retail price at butchery shops	Fresh meat with bone price at meat stores	Export market rate of fresh meat for Afghanistan
Rs. 440/kg	Rs. 440-480/kg	Rs. 450-550/kg	\$ 3.50-4.5/kg of meat

### 5.4 Maintaining standards

Presently, the slaughterhouses in KP province are regulated by District government, Livestock and Dairy Development Department (L&DD) and KP Food Safety and Halal Food Authority, are not complying food safety practices because cattle value chain stakeholders are not following good hygiene practices (GHP), good manufacturing practices (GMP) and Hazard Analysis and Critical Control Point (HACCP) which are basic food safety standard around the globe. The slaughterhouse location and facilities available are not enough to meet the food safety requirements for meat supply chain. Pakistan is one of world major producer of halal meat owing to natural resources for livestock, Muslim population, non-existence of stunning for animal slaughtering but have negligible share in global halal export meat market due to non-compliance of food safety. This potential can be utilized and access in the global export meat market can be enhanced by fulfilling the World Trade Organization's (WTO), Sanitary and Phytosanitary standards (SPS) measures, Halal requirements and ISO 22000 for exports. Currently, local slaughterhouses needs a substantial efforts to meet food safety compliance whereas, the slaughterhouses exporting meat to low end markets can better equip and needs minimum efforts for reaching the food safety compliance for exporting to high end markets.

### **5.5 Exchange rate fluctuation**

The exchange rate of Pakistani rupee is quite stable for last couple of months after a volatile period of approximate six months in reign of present government. The price regulation and exchange rate overall affect business and exchange rate influence the export market of the meat. The volatile exchange rate affects the business community more than everyone, because of the uncertainty it exhibits. Accordingly, Kandilov (2008) revealed that exchange rate volatility has large negative effect on the agricultural trade between countries. The effect is much larger for developing countries exporters than the developed countries' exporters. But in Pakistan it is expected that after the downward adjust of Pakistan rupee against US dollar, the exchange rate will remain stable in near future and will be helpful to agricultural exports.

### **5.6 Increasing competition and other factors**

One of the important reasons for non-establishment of slaughterhouse with food safety compliance is price decapping, weak regulatory framework and slaughterhouse capacity to comply food safety due to lack of knowledge and training of butchers. Similarly, training butchers regarding food safety compliance and price decapping will increase competition considering the quality and safety aspects of fresh cattle meat sold to the consumers in local market that will further improve food safety compliance of the slaughterhouses for export to high end markets.

### **References**

- Trade and Markets Division. (2013) Food outlook: Biannual report on global food markets. Published by Food and Agriculture organization (FAO). pp. 139
- Kandilov, I.T., (2008). The effect of Exchange Rate Volatility on Agricultural Trade. American Journal of Agricultural Economics. Vol. 90, No.4, pp. 1028-1043. [https://www.jstor.org/stable/20492351?seq=1#metadata\\_info\\_tab\\_contents](https://www.jstor.org/stable/20492351?seq=1#metadata_info_tab_contents)
- Pre-Feasibility Study Meat Processing Unit and Slaughter House. 2019. Small and Medium Enterprises Development Authority, Ministry of Industries & Production, Government of Pakistan

## **PRE-FEASIBILITY FOR MEAT PROCESSING PLANT**

The proposed meat processing unit (5000kg/5ton meat per day) will work for processing and value addition of meat of different animals with food safety compliance requirement. Pakistani peoples prefer to consume fresh and process meat products but level of processing and value addition is very limited in Pakistan especially in KP province. There are few meat processing companies such as Euro Food, Farmers Food and Continental food working in Peshawar for processing of cattle and chicken meat and meat products. The processing of meat processing is crucial for sustainability of the meat value chain as this creates demand for meat resulting efficient marketing of meat to earn good return of meat animals by farmers as well as provision of safe and healthy meat products for meeting the nutritional needs of consumers that is essential for development of meat sector.

**Table 1. Project cost for establishing meat processing unit**

<b>No.</b>	<b>Description</b>	<b>Amount in Pak Rupees</b>
01	Machinery for meat processing plant	96950000
02	Building & Infrastructure	49284480
03	Furniture of meat processing plant	9272000
04	Office equipment for processing plant	1909000
05	Human resource needed for processing plant	1387000
<b>Total</b>		<b>158802480</b>

### **1. Required Features for meat processing plant**

#### **1.1 Strategic location**

The meat processing unit can be established preferably in industrial area with main roads and basic facilities such as electricity, water and fuel sources needed for processing are easily available there. Also, accessibility, existence of necessary logistic facilities, human resource, operational business activities and workers with knowledge of food safety will be additional demand for establishment of meat processing facility.

#### **1.2 Size including open space**

The space requirement for proposed meat processing plant is 46008 square feet considering various facilities including open area in meat processing facility, covered area for meat processing and offices, raw material storage, staff accommodation, admin rooms and washrooms, cold storage, pavement/driveway as well as cafeteria & parking area in the facility for the development of value added meat products for consumers (Table 1.2).

#### **1.3. Meat processing unit**

The meat processing unit with facilities like cold storage and packaging unit for processing and value addition of cattle meat detail is in Table 1.1.

#### 1.4 Office: See section 1.3

**Table 1.1. Machines & Equipment for meat processing unit**

No.	Machine	Quantity	Unit cost	Total Cost estimates
1	Automatic meat processing line including bowl chopper, mixing unit, vacuum filler, formic shape, smoke house and fryer for developing meat products such as nuggets, tender pops, patties, seekh kabab, sausages, bologna slices, shami kabab, chappali kabab and kofta, paprika as well as fillets etc.	1	65000000	65000000
2	Cold storage	1	8,000,000	8000000
3	Packaging line	1	10000000	10000000
4	Refrigerated vehicle	2	5,600,000	11200000
5	Generators and solar system	2	250000	500000
6	Tube well for water supply	1	250000	250000
7	Miscellaneous	1	2,000,000	2000000
<b>Total</b>				<b>96950000</b>

#### 2. Required resources for operationalization

##### 2.1 Building

The civil work divided into sections including open area, covered area, offices, raw material storage, staff accommodation, admin rooms & washrooms, cold storage area, pavement/driveway, cafeteria as well as parking area for the meat processing facility. The cost of construction per ft<sup>2</sup> for open area is 600 Pak Rupees, for meat processing and office is Pak Rupees. 3500 per square feet, cold storage area Rs. 3100 per square feet and duty staff and admin rooms is estimated Pak Rupees 2100 square feet considering the estimated current market rate. Also, the details of space requirement along with cost for the establishment of the meat processing facility given in Table 1.2.

**Table 1.2. Building & Infrastructure**

No.	Description	Expected area (Square Feet)	Unit Cost in Pak Rupees	Estimated Cost in Pak Rupees
1	Open area meat processing facility	2500	600	1500000
2	Covered area meat processing plant	5440	3,500	19040000
3	Management building	2720	2600	7072000
4	Raw material Storage	2720	1700	4624000
5	Staff washrooms	544	2,000	1088000
6	Cold storage area	1632	3100	5059200
7	Pavement/driveway	5000	600	3000000
8	Cafeteria and parking area	1088	2100	2284800



9	Staff accommodation and admin rooms	1360	2100	2856000
10	Ground/Boundary wall	23004	120	2760480
<b>Total Area</b>		<b>46008</b>		<b>49284480</b>

**Table 1.3. Furniture for the meat processing plant**

No	Description	Quantity needed	Unit cost in Pak Rupees	Total cost in Pak Rupees
1	Furniture	1	1000000	1000000
2	Carpeting work	2720	2600	7072000
3	Electrical wire & Lights	1	1200000	1200000
<b>Total</b>				<b>9272000</b>

**Table 1.4. Office Equipment for the meat processing plant**

No	Description	Quantity needed	Unit cost in Pak Rupees	Total cost in Pak Rupees
1	Air Conditioner Inverter (1.5 ton)	8	80000	640000
2	Printers	2	22,000	44000
3	Desktop Computers	4	65000	260000
4	Uninterrupted Internet Services	1	30,000	30000
5	Security Camera Setup	1	500000	500000
6	Telephone Exchange	1	240,000	240000
7	Fax machine	1	45000	45000
8	Photocopier with scanner	1	150000	150000
<b>Total</b>				<b>1909000</b>

### **3. Production Scope of the meat processing unit**

The processing and value addition of meat of different animals such as cattle, goat and chicken carried out with objective to develop variety of meat products, to create meat demand by increasing marketability, utilize meat animals carcass to value added products, to preserve and transport meat products with increased shelf life to larger population, to facilitate export by reducing wastage & value addition as well as extension of shelf life of meat through value added products. Pakistan is an agricultural country where more than 70 % population live in villages and generate income through agriculture and livestock. The livestock rearing constitutes an integrated and is vital segment of rural economy. In general, important meat producing species are largely those animals which consume food of plant origin like buffalo, cattle, sheep, goat and camel and these halal meat animals are one of the major source of fresh meat for the local consumption and export market.

#### **3.1 Processing capacity of unit**

The meat processing unit having processing, value addition and packaging facility by meeting food safety requirements will be 5 tons/ day.

### 3.2 Staff

The project is supposed to provide employment to 50 people directly whereas, semi-skilled workers for packaging and processing required and their number depends on capacity of meat processing facility if increased. Also, farmers, contractors, food additives suppliers, packaging suppliers as well as other allied industries will also get benefitted from this meat processing facility.

### 3.3 Equipment supply

Automatic meat processing unit, storage facility and packaging line for processing and value addition will be imported either from Japan/Italy/China/Germany considering price and quality of the machinery. The meat processing line with specifications (receiving unit, mixing unit, cooking pan, fryer and other necessary units) will be imported after consultation with experts and supply & demand side of the cattle meat animals. The Cogemat Italy, RAYS Technologies, Lahore and as well as Multivac, Germany can be contacted for the purchase of these equipments and processing lines.

### 3.4 Meat processing capacity of unit

The processing and value addition capacity of meat processing facility with food safety compliance is 5 tons/day.

### 3.5. Human resource/Staff for meat shop

Please see at section 1.5

**Table 1.5. Human resource for meat processing plant**

No	Human Resource	No. of Employees	Expected Unit Salary (PKR) in Pak Rupees	Total salary in Pak rupees
01	Owner/Manager/CEO	1	150,000	150000
02	Admin Officer	2	29,000	58000
03	HR Manager	1	35,000	35000
04	Cleaning Staff	5	18,000	90000
05	Veterinary Doctor	1	80,000	80000
06	Food Safety Expert	1	55,000	55000
07	Food Technologist	2	50,000	100000
08	Supporting Labors to processors and packaging	25	20,000	500000
09	Marketing Manager	1	50,000	50000
10	Marketing Assistants	3	25,000	75000
11	Accounts Officer /Cashier	1	28,000	28000

12	Security Guard	2	20,000	40000
13	Drivers	2	18,000	36000
14	Electrician	1	20,000	20000
15	Sanitation Expert	1	35000	35000
16	Security Expert	1	35000	35000
<b>Total</b>		<b>50</b>		<b>1387000</b>

## 5. Sensitivity indicators

### 5.1. Attracting small farmers

The livestock sector provides food of animal origin to a population of more than 35.53 million people of which 82% are rural dwellers having great dependence on agriculture and livestock. The KP province has produced 580.410-ton meat during 2016-17 and this production is rising annually. The meat produced in the province is mainly consumed as fresh by the peoples and a small portion of meat ( $\leq 5\%$ ) is processed for developing value added meat products in Pakistan and this portion for meat processing is even lesser in the KP. Small meat animal's farmers are largely dependent on commission agents (Arthis) or butchers for marketing of the animals and they mostly sell their produce at low price due to the limited availability of meat processing facilities. Also, meat being a perishable food commodity need preservation technologies like refrigeration and freezing for increasing shelf life and quality of the meat. The processing and value addition of meat carcass will increase the shelf life and microbial safety of the products and provide meat animals farmers to sell their produce at a much high rate.

### 5.2. Meat Suppliers

The meat processing and value addition facility will open new avenues for meat animal farmers to sell their produce at much high rate and will also develop a competitive market for development of cattle value chain. Also, the Pakistani export market is mainly dominated by meat animal carcass or its parts that bring lower price compare to the value-added meat products. Therefore, developing value added products will provide variety for the consumers and earn foreign exchange from the export that will also encourage meat suppliers for the growth of meat value chain. The major constrains cattle meat supply chain development in Pakistan is lack of food safety compliance and majority export markets are not giving us access for safety compliance so meat processing facility with food safety compliance will encourage other stakeholders to enable cattle meat producers to add value to their products and sale to the high end market by compliance of food safety.

### 5.3. Price fluctuations

The price information given in below table show average fresh cattle meat price in KP province as well as for export market. The average price per kilogram of meat for local market varies from Rs. 420-550 during the year 2019 in different meat shops, meat stores as well as hypermarkets (Figure 1) whereas, the price for the export varies from \$3.5 to 4.5/kg meat. The meat prices for local are

mainly regulated by district government whereas, the Pakistani meat exporters mainly have access to low end export markets like Afghanistan due to food safety compliance.

**Table 1. Price of fresh cattle meat at butchery shops, meat stores and export market**

Local government rate for fresh meat with bone	Fresh meat with bone retail price at butchery shops	Fresh meat with bone price at meat stores	Export market rate of fresh meat for Afghanistan
Rs. 440/kg	Rs. 440-480/kg	Rs. 450-550/kg	\$ 3.50-4.5/kg of meat

#### **5.4. Maintaining standards**

Presently, the slaughterhouses in KP province are regulated by District government, Livestock and Dairy Development Department (L&DD) and KP Food Safety and Halal Food Authority, are not complying food safety practices because cattle value chain stakeholders are not following good hygiene practices (GHP), good manufacturing practices (GMP) and Hazard Analysis and Critical Control Point (HACCP) which are basic food safety standard around the globe. The slaughterhouse location and facilities available are not enough to meet the food safety requirements for meat supply chain. Pakistan is one of world major producer of halal meat owing to natural resources for livestock, Muslim population, non-existence of stunning for animal slaughtering but have negligible share in global halal export meat market due to non-compliance of food safety. This potential can be utilized and access in the global export meat market can be enhanced by fulfilling the World Trade Organization's (WTO), Sanitary and Phytosanitary standards (SPS) measures, Halal requirements and ISO 22000 for exports. Currently, local slaughterhouses needs a substantial efforts to meet food safety compliance whereas, the slaughterhouses exporting meat to low end markets can better equip and needs minimum efforts for reaching the food safety compliance for exporting to high end markets.

#### **5.5. Exchange rate fluctuation**

The exchange rate of Pakistani rupee is quite stable for last couple of months after a volatile period of approximate six months in reign of present government. The price regulation and exchange rate overall affect business and exchange rate influence the export market of the meat. The volatile exchange rate affects the business community more than everyone, because of the uncertainty it exhibits. Accordingly, Kandilov (2008) revealed that exchange rate volatility has large negative effect on the agricultural trade between countries. The effect is much larger for developing countries exporters than the developed countries' exporters. But in Pakistan it is expected that after the downward adjust of Pakistan rupee against US dollar, the exchange rate will remain stable in near future and will be helpful to agricultural exports.

#### **5.6. Increasing competition and other factors**

One of the important reasons for failure to boost value added meat products export from Pakistan has been its inability to supply the well processed, preserved and high quality meat products as per the demand of the international market. Moreover, the food safety compliance of the beef supply chain and meat based products is one of major hurdle in the export of these products. Currently Pakistan is not exporting any processed beef meat products to any country however, a good amount of potential exist to export to Qatar, Saudi Arabia, Bangladesh and UAE.

## References

Trade and Markets Division. (2013) Food outlook: Biannual report on global food markets. Published by Food and Agriculture organization (FAO). pp. 139

- Kandilov, I.T., (2008). The effect of Exchange Rate Volatility on Agricultural Trade. American Journal of Agricultural Economics. Vol. 90, No.4, pp. 1028-1043. [https://www.jstor.org/stable/20492351?seq=1#metadata\\_info\\_tab\\_contents](https://www.jstor.org/stable/20492351?seq=1#metadata_info_tab_contents)
- Pre-Feasibility Study Meat Processing Unit and Slaughter House. 2019. Small and Medium Enterprises Development Authority, Ministry of Industries & Production, Government of Pakistan

## **PRE-FEASIBILITY OF ANIMAL CASING PLANT**

The proposed natural casing plant using animal intestine (20000 casing/day) will work for utilization of different byproduct like the intestine of the animals. The meat animals provide meat carcass, edible offal and non-edible offal. The non-edible offal such as intestine can be used for the preparation of the sausage casing whereas, the bones and hides are mainly used for the production of the gelatin that can be used as a food ingredient in different food products. Among the animal products for the export, sausage casing exhibit the second largest export commodity mainly exported to EU markets from Pakistan is byproducts of meat animals. The intestine of cattle rearing for milking as well as for meat in KP are mainly dumped to animal disposal waste that can be converted to the value added sausage casing for development of natural meat products such as sausages and other meat products. The literature showed following operation usually involved in developing natural animal casing from intestine



### **1. Required Features for establishment of animal casing plant**

#### **1.1 Strategically located**

The animal casing plant should be strategically located outside residential area in close proximity of slaughterhouse that will provide raw material for this plant. Also, road access and other basic facilities like availability of fresh water, proper sanitation & waste disposal area, electricity *etc.* should be there for establishing this facility for the development of the natural casing from intestine.

#### **1.2 Size including open space**

The space requirement for proposed animal casing plant is 1916 square feet including smelly / receiving area, washing area, value addition facility including tables with washing area, office and parking area (Table 1.1). The building for the facility will be rented for the cost management and to decrease the expenses however, the site can be established with purchasing land and its cost varies in different locations of in KP province.

**Table 1. Project Cost for establishing natural animal casing plant**

No.	Description	Amount in Pak Rupees
01	Land rent for facility	70000
02	Building & Infrastructure	2460600
03	Machinery for casing plant	2812000

04	Furniture for the casing plant	278000
05	Fixture and other related items	325000
05	Recurring cost including salaries	305000
<b>Total Project Cost</b>		<b>6250600</b>

## 2. Required resources for operationalization of the plant

### 2.1 Building

The civil works divided into sections including smelly/receiving area, washing area, value addition facility including tables with washing area, office and parking area. The cost of construction per square feet for smelly / receiving area is 1600 Pak Rupees, for washing & office establishment is Rs. 1600 per square feet, and for parking area is estimated Rs. 500 square feet considering current market rate. The detail of space requirement and cost related to land & building are given in table 1.1.

**Table 1.1. Building & Infrastructure**

No	Description	Required Area (Square feet)	Unit Cost in Pak Rupees	Expected Cost in Pak Rupees
01	Smelly / Receiving Area	272	1600	435200
02	Washing Area	272	1600	435200
03	Tables with washing facility	550	1600	880000
04	Office	272	1600	435200
05	Parking area	550	500	275000
<b>Total</b>		<b>1916</b>		<b>2460600</b>

**Table 1.2. Machinery and accessories required for animal casing plant**

No.	Machines needed	Quantity	Estimated Unit Cost in Pak Rupees	Total cost in Pak Rupees
1	Water Pump	1	95000	95000
2	Water Storage tanks 500 Gallons	5	18000	90000
3	Water Supply lines 10ft length	25	1000	25000
4	Water Nozzles	10	800	8000
5	Packaging machines	2	500000	1000000
6	Generator	1	250000	250000
7	Electric & Water Wiring	1	50000	50000
8	Deep Freezers	2	112000	224000
9	Ceramic Top Tables for Washing	10	20000	200000
10	Water Tubs	20	2000	40000
11	Water Tanks Blue Plastic	20	4000	80000
12	Solar unit	1	450000	450000



13	Miscellaneous	1	300000	300000
<b>Total</b>				<b>2812000</b>

**Table 1.3. Furniture for animal casing plant**

No.	Items required	Quantity	Estimated Unit Cost in Pak Rupees	Total cost in Pak Rupees
1	Office Chair	8	10000	80000
2	Stools	12	1500	18000
3	Tables	12	15000	180000
<b>Total</b>				<b>278000</b>

**Table 1.4. Fixture and other related items for Animal casing plant**

No.	Machine	Quantity required	Estimated Unit Cost in Pak Rupees	Total cost in Pak Rupees
1	Printer	1	22000	22000
2	Telephone and Internet Service facility	1	33000	33000
3	Desktop computer with accessories	1	75000	75000
4	Fax machine	1	45000	45000
5	Photocopier	1	150000	150000
<b>Total</b>				<b>325000</b>

### **3. Production Scope of animal casing production unit**

The value addition is one of the important aspects that actually convert the low value product into the high value product. The intestine of the animals mostly going into the animal waste can be converted into the natural casing that can be used to develop variety of meat products like sausages in the Pakistan and can be exported to earn foreign exchange. The middlemen/contractors will procure intestines from butchers and then they will supply the intestines through making long-term contracts with butchers in slaughterhouses and then they will supply to facility for developing animal casing for developing meat products.

#### **3.1 Processing capacity of unit**

The animal casing plant will have value addition and packaging facility as per requirements of food safety compliance of 20000 intestines per day.

#### **3.2 Staff**

The project is supposed to provide employment to 13 people directly and many butchers and agents indirectly. Also, the farmers, butchers, contractors, transporters and exporters and industries will also get benefitted from this facility.

#### **3.3 Equipment supply**

The machinery equipment's and different accessories for animal casing plant will be procured from the local market or from China depend on price and quality of machinery.

### 3.4 Meat processing capacity of unit

The animal casing production capacity for this plant will be 20000 casings/day.

### 3.5. Human resource/Staff for meat shop

Please see at section 1.5

**Table 1.4. Human Resource for casing plant**

No.	Description	No. of Employees	Estimated Unit Cost in Pak Rupees	Total cost in Pak Rupees
1	Plant Manager/owner	1	60000	60000
2	Washing Labor	10	20000	200000
3	Security Guard	1	20000	20000
4	Admin officer	1	25000	25000
<b>Total</b>		<b>13</b>		<b>305000/-</b>

## 5. Sensitivity indicators

### 5.1. Attracting small farmers

The animal casing will attract the butchers who are involved in animal slaughtering and provide the extra amount by selling these intestine to the animal casing unit.

### 5.2. Butchers for intestine Suppliers

The butchers will provide the intestine for the value addition of the meat animals casing. At the start of the plant, the price will be low but the awareness will raise the price of these intestine and therefore long term contracts are required for the supply of the raw material for the casing plant.

### 5.3. Maintaining standards

Presently, the animal casing plants are not present in KP province and mostly these intestine are going into waste. So developing these facilities with food safety compliance standard like Hazard Analysis and Critical Control Point (HACCP), ISO 22000 and World Trade Organization's (WTO), Sanitary and Phytosanitary standards (SPS) measures, Halal requirements can be helpful for developing export market of these animal casing.

### 5.4. Exchange rate fluctuation

The exchange rate of Pakistani rupee is quite stable for last couple of months after a volatile period of approximate six months in reign of present government. The price regulation and exchange rate overall affect business and exchange rate influence the export market of the meat. The volatile exchange rate affects the business community more than everyone, because of the uncertainty it exhibits. Accordingly, Kandilov (2008) revealed that exchange rate volatility has large negative effect on the agricultural trade between countries. The effect is much larger for developing countries exporters than the developed countries' exporters. But in Pakistan it is

expected that after the downward adjust of Pakistan rupee against US dollar, the exchange rate will remain stable in near future and will be helpful to agricultural exports.

### **5.5 Increasing competition and other factors**

The main reason for failure to boost exports of value added byproducts of meat animal like casing can be developed. Although there is very limited demand of the natural casing for meat products in Pakistan due to complexity of the halal authenticity system but developing halal authenticity and food safety and quality compliance can convert these low value intestine into high value products for export market to EU and USA.

### **References**

- United Casing Pakistan. <https://www.unitedcasings.com/>
- Qadir Baksh Casing: <http://qadir.com.pk/our-products/sheep-casing/>

