Human Resource Development Plan

Submitted to

Government of Nepal
Ministry of Livestock Development
Singha Durbar, Kathmandu, Nepal

Submitted by

Nepal Administrative Staff College
Jawalakhel, Lalitpur, Nepal

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Acronyms and Abbreviations

%	Percentage
ADS	Agriculture Development Strategy
AI	Artificial Insemination
AI and ET	Artificial insemination and embryo transfer
CTEVT	Council for Technical Education and Vocational Training
DFTQC	Department of Food Technology and Quality Control
DLS	Department of Livestock Services
DLSO	District Livestock Services Office
DLSTE	Directorate of Livestock Services Training and Extension
DVM	Doctor in Veterinary Medicine
ET	Embryo Transfer
FGD	Focused Group Discussion
GIS	Geographical Information System
GMO	Genetically Modified Organism
GoN	Government of Nepal
GPS	Global Positioning System
HR	Human Resource
ICT	Information and Communication Technology
JT/JTAs	Junior Technicians/Junior Technical Assistants
KSA	Knowledge, Skills and Attitude
LPM	Livestock Production Management
M and E	Monitoring and Evaluation
MoAD	Ministry of Agricultural Development
MoLD	Ministry of Livestock Development
MToT	Master Training of Trainers
NARC	Nepal Agricultural Research Center
NASC	Nepal Administrative Staff College
NGR	Natural Genetic Resources
No.	Number
NVA	Nepal Veterinary Association
OIE-PVS	Office Inernationale des Epizootics - Performance of Veterinary Services
RLSTCs	Regional Livestock Services Training Centers
SLA	System Learning Approach
TBT	Technical Barriers to Trade
TCL	Technical Certificate Level
TNA	Training Needs Assessment
ToR	Terms of Reference
ToT	Training of Trainers
WTO-SPS	World Trade Organization - Sanitary and Phyto-Sanitary

Contents

1. Background

1.1. Introduction to Ministry of Livestock Development

The Ministry of Livestock Development (MoLD) was established by the Government of Nepal in 2072 Poush to make the country self-sufficient in milk, meat and eggs through speedy development of livestock sector. The MoLD has the following Vision, Mission, Objective and Functions

Vision: Food sovereign and prosperous Nepal through sustainable livestock development.

Mission: Food and nutrition security through sustainable livestock production for higher economic growth.

Objectives:

- Commercialization and import substitution;
- Integrated technical services, credit, insurance;
- Food security and reduction of malnutrition;
- Encourage women, youths in production, processing, marketing;
- Control and /or eradication of animal diseases; and
- Need based technology transfer.

Functions: According to the Nepal Sarkar, Karya Bibhjan Niyamawali 2072, the functions of MoLD includes:

- Formulation, implementation, monitoring and evaluation of policies, plans and programs related to livestock development;
- Development and promotion of livestock and livestock products;
- Research and technology dissemination;
- Research, development and extension of agriculture engineering and improved agriculture tools;
- Livestock extension and youth livestock program;
- Development of fodder tree nursery and seed;
- Commercialization and industrialization of livestock sector and market management and expansion of livestock products;
- Food quality standard, research, control and extension;
- Food and animal quarantine;
- Quality standard, certification and regulation of seeds, saplings, seedling ;
- Study, research, survey and surveillance of animal diseases and food security;
- Animal disease information system;
- Organic farming and organic certification;
- Development and extension of bio-technology and agro-biodiversity;

- Livestock insurance;
- Accreditation, standardization and certification of livestock commodities, service and technology;
- Accreditation of laboratories; and
- Livestock Farm and Center.

1.2. Existing structure and human resources

There are different boards, committees, research, departments, regional livestock directorates, district offices, and service centers under the Ministry. At present, there are 4,261 staff in two groups (*Samuha*) under the Ministry - livestock, poultry and dairy development, and veterinary. (Annex 1, Table 1)

1.3. Concern for Human Resource Development

Human resource (HR) is the most important and key resource to organizational success. HR acquiring and mobilizing other organizational resources performs to achieve organizational goals. Being crucial organizational resource, updating its capacity to address emerging challenges and meet changing working situation of organizations is must. Therefore, regular capacity development of human resources is an important aspect in organization management and development. Human resource development (HRD) is a process for developing human competencies through time-bound organized learning experiences to improve productive contribution of people for achieving organizational goals effectively and efficiently. The HRD efforts should fit in with the developmental needs of organizational members. It is the institutionalization of all effective components of human resource management: training and development, performance management and career development. The HRD activities can take place in different forms in organizations, such as job rotation, job enlargement, job enrichment, training and development.

1.3.1. Principles of designing HRD

- Principle of continuous development;
- Principle of ownership and management;
- Principle of employees' learning development needs;
- Principle of serving individual as well as organizational goals; and
- Principle of investment in time as investment in other activities.

1.3.2. HRD mechanism

HRD mechanism includes its working activities and their interconnectedness with each other to increase productivity and quality of work life. The key HRD mechanisms are: ***training and***

management development. Performance evaluation and succession planning provide input about HRD needs of employees.

Training	Management Development
• Focus on present jobs; • Task-oriented; • Short term periodic process; • Target is operative employees; • Confined to hands-on skills and knowledge; • Remedial effort; • Reactive to current needs; • Management initiated; and • Employee participated	• Focus on future responsibilities; • Growth oriented; • Long term ongoing educational process • Target is managerial employees • Develops conceptual, interpersonal, technical and decision making skills • Develop employee potential capable of achieving; • Proactive to future needs; • Employee initiated; and • Management facilitated.

1.4. Need of HRD

In the changed context of governance after the promulgation of Constitution of Nepal in 2072 and institutional arrangement of GoN under federal constitution, the implementation of three tires structure to deliver services to the public has become mandatory for all sectoral ministries of GoN. The required provisions under new institutional arrangements demand HR competency mapping of every institutions to align with the government mission of delivering services to public at large. This calls for human resource development which includes:

- Ensure availability of capable and committed manpower;
- Improve competencies;
- Enhance effectiveness;
- Foster teamwork;
- Facilitate career development;
- Increase job satisfaction;
- Improve decision-making;
- Manage change and conflicts;
- Succession planning; and
- Environmental adaptation.

In order to meet these needs, this HRD plan has been prepared, acknowledging the request of MoLD,to achieve its mission of food and nutrition security through sustainable livestock production to help the nation for improved self-sufficiency through commercial and competitive livestock development.

The plan has considered the present mandate of federalization, analysis of present **HR capacity competency** (education, training and experience) to meet the government and public expectations for enhanced service quality and meet service demand.

1.5. Objectives of Study

The work provides professional recommendation for required Human Resource Development Plan in the changed context including:

- Defining the HR competency framework of MoLD in the changed context; and
- Assessing HR Gap in terms of capabilities for better service rich and reach as per the new federal institutional arrangements.

1.6. Study Methodology

The following approach, methods, tools and sources were adopted to identify actual HR competency and functional gaps guided by the study framework mentioned in the Section 3.

i. Methods

- Interview;
- Observation ;
- Focus group discussion; and
- Workshop.

ii. Tools

- Questionnaire; and
- Checklist.

iii. Sources

a. Primary sources

Information was collected from the following primary sources:

- Farmers / cooperatives / producer associations / entrepreneurs / agro-industries / consumers and communities;
- Officials working at different levels (federal, provincial, and local) within and outside Kathmandu valley;
- Secretary of MoLD;
- Admin-experts, academicians and ex-government officers;
- National Agriculture Research Center, Agriculture and Forestry University, Tribhuvan University, Purbanchal University and Council for Technical Education and Vocational Training; and
- Field visits in eleven (11) selected districts covering at least one service center in each district, District Livestock Services Office (DLSO), Livestock Farms, Fish Development Centers, Quarantine Offices (animal and food quarantine) and Regional Offices such as Regional Directorate of Livestock Services, Regional

Laboratories and Regional Food and Quality Control Offices, Regional Training Centers; Central Offices: Program Directorates, Departments (DLS, DFTQC); and MoLD.

The list of sample districts covered are:

Province	Mountain	Hill	Terai	Total
1	-	Dhankuta	Morang	2
2	-	-	Dhanusha	1
3	-	Kathmandu	Chitwan	2
4	Mustang and Manang	Kaski	-	3
5	-	-	-	-
6	Jumla	-	-	1
7	-	Dadeldhura	Kailali	2
Total	**3**	**4**	**4**	**11**

Respondents were selected in such a way that they nearly represent as proxy for federal, province and local level institutions. Present central level organizations such as ministry, departments and NARC were considered as representative of federal level, regional offices (livestock and food) as representative of province, and district level organizations as representative of local level institutions. Mapping of respondents are as follows:

S.N.	District	KII	PRA	FGD	Others		Total
					Consumers	Academia	
1	Kathmandu	3*	40	32	4	2	**81**
2	Kaski	-	17	15	-	-	**32**
3	Morang	-	13	18	3	4	**38**
4	Chitwan	-	19	29	-	1	**49**
5	Dhanusha	-	6	8	-	-	**14**
6	Dhankuta	-	3	15	-	-	**18**
7	Manang	-	5	6	-	-	**11**
8	Mustang	-	3	7	-	-	**10**
9	Jumla	-	3	12	-	-	**15**
10	Kailali	-	14	16	-	-	**30**
11	Dadeldhura	-	7	18	-	-	**25**
Total		**3**	**130**	**176**	**7**	**7**	**323**

* includes former secretary as well as senior food experts

b. Secondary sources

Information was collected from the following secondary sources:

- Constitution of Nepal, 2071;
- Policies, acts, rules, regulations and strategic plan;
- Relevant research studies and reports;
- Regional and global practices of MoLD; and
- Desk review of present mandate in federal structure.

1.7. Scope and limitation of study

The scope and limitation of study are:

- Analysis of HR competency gap is based on information collected from 11 sample districts as identified in the ToR;
- Methods such as semi-structured questionnaire survey, interviews and focus group discussions were adopted to collect information;
- Major stakeholders such as staffs, academia, farmers, cooperatives, local leaders and entrepreneur were consulted during the study;
- Competencies for three tiers of government are identified based on functional analysis of employees and offices;
- In the absence of integrated HR information system, existing HR competency was analyzed on the basis of information available at the ministry and concerned departments;
- As the structure of three tiers of governments has not been materialized, functional analysis and service mapping is carried out on the basis of constitutional provisions and available related reports and studies; and
- Perspectives of related academic institutions have been derived through desk review and consultation.

2. Context

2.1. Mandate of Ministry of Livestock Development

The Constitution of Nepal has underscored the importance of agricultural/livestock sector as a major economic activity of the country. Livestock functions are included in fundamental rights of citizens, state directives and the allocation of functions to the three tiers of government. Similarly, Schedule 5, 6, 7, 8 and 9 of the Constitution has allocated functions to the different tiers of government in order to devolve livestock development nearest to the farmers and farm.

2.1.1. Fundamental rights of Citizens

According to the Article 25 (4), The provisions of clauses (2) and (3) shall not prevent the State from making land reforms, management and regulation in accordance with law for the purposes of enhancement of product and productivity of lands, modernization and commercialization of agriculture, environment protection and planned housing and urban development.

Article 36 Right to food makes following provisions:

(1) Each citizen shall have the right to food;
(2) Every citizen shall have the right to be protected from a state of starvation, resulting from lack of food stuffs; and
(3) Every citizen shall have the right to food sovereignty as provided for in law.

Article 42 'Right to social justice ensures:

(2) Citizens who are economically very poor and communities on the verge of extinction, shall have the right to special opportunity and facilities in the areas of education, health, housing, employment, food and social security, for their protection, progress, empowerment and development; and
(4) Each peasant shall have the right to access to land as provided for in law for agricultural purposes, along with the right to choose and preserve traditionally adopted and used endemic seeds and agricultural species.

2.1.2. State directives

Article 51 'State Policies' (e) Policies regarding agriculture and land reform:

(1) Introducing scientific land reform by ending dual ownership of land for the benefit of farmers;

(2) Increasing production and productivity through land plotting and by discouraging absentee land ownership;
(3) Protecting and promoting rights and interests of peasants and utilizing the land use policy for increasing production and productivity of agriculture and for commercialization, industrialization, diversification and modernization of agriculture;
(4) Making proper utilization of land through proper regulation and management on the basis of productivity of land, its nature, and also by maintaining environmental balance; and
(5) Making arrangements for agricultural tools and an access to market with appropriate price for the product.

Article 51 State Policies, (h) Policies regarding the basic needs of the citizens (12) Increasing investment in the agricultural sector by making necessary provisions for sustainable productivity, supply, storage and security, while making it easily available with effective distribution of food grains by encouraging food productivity that suits the soil and climate conditions of the country in accordance with the norms of food sovereignty.

2.1.3. Allocation of functions

Federal exclusive functions (as per the Schedule 5)

- Quarantine
- Land use policy

Provincial exclusive functions (as per the Schedule 6)

- Livestock development
- Land management

Federal and province concurrent functions (as per the Schedule 7)

- Land policy
- Pesticides (for veterinary use)
- Cooperative
- Research
- Veterinary services, amchi and other professions

Local exclusive functions (as per the Schedule 8)

- Livestock production
- Animal health
- Cooperatives
- Management, operation of livestock extension

Federal, provincial and local concurrent functions (as per the Schedule 9)

- Agriculture

2.2. Livestock development landscape in provinces

Seven provinces vary in terms of natural and other resource endowments like physiography, rainfall pattern, climatic regime, water resources, biodiversity and physical area. The physical size or area of the province ranges from 9 to 19 percent, number of districts ranges from 8 to 14 districts, population ranges from 4 to 21 percent of the total. So, each province requires province-specific HR and livestock development approach with due consideration of diverse peculiarities of the provinces. These newly formed provinces have power to formulate, implement and coordinate plan for their own development. In other words, the apex livestock development body of the province (provincial ministry/department) may have to function as of the present MoLD. The area and population as well as potentiality of livestock, food and quarantine services in the provinces in general has been presented below:

Province, area & population	Districts	Livestock landscape		
		Mountain	Hill	Terai
No. 1 Area: 25,905 km² (18%) Pop: 4,534,943 (17%)	1. Bhojpur 2. Dhankuta 3. Ilam 4. Jhapa 5. Khotang 6. Morang 7. Okhaldhunga 8. Panchthar 9. Sankhuwasabha 10. Solukhumbu 11. Sunsari 12. Taplejung 13. Terhathum 14. Udayapur	- Medicinal herbs, dairy products, yak/*chauri* and sheep/*chyangra*	- Dairy animals, dairy industry, goat and pig	- Cattle, buffalo, poultry, dairy industries and quarantine services
No. 2 Area: 9,661 km² (7%) Pop: 5,404,145 (20%)	1. Bara 2. Dhanusha 3. Mahottari 4. Parsa 5. Rautahat 6. Saptari 7. Sarlahi 8. Siraha	-	-	- Fish, cattle, buffalo, goat, poultry, agro-industry, and quarantine services
No. 3 Area: 20,300 km² (14%) Pop: 5,529,452 (21%)	1. Bhaktapur 2. Chitwan 3. Dhading 4. Dolakha 5. Kathmandu 6. Kavrepalanchok 7. Lalitpur 8. Makwanpur 9. Nuwakot 10. Ramechhap 11. Rasuwa 12. Sindhuli 13. Sindhupalchok	- Rainbow trout fish, yak/chauri and sheep/chyangra	- Poultry, cattle, buffalo, goat, agro-industry and quarantine services	- Fish, bee, poultry, buffalo, cattle, dairy, goat, feed industry, agro-industry, and quarantine services
No. 4 Area: 21,504 km² (15%) Pop: 2,413,907	1. Baglung 2. Gorkha 3. Kaski 4. Lamjung 5. Manang	- Yak, sheep and chayangra	- Poultry, cattle, buffalo, goat and agro-industries	-

(9%)	6. Mustang 7. Myagdi 8. Nawalparasi (east of Bardaghat Susta) 9. Parbat 10. Syangja 11. Tanahun			
No. 5 Area: 22,288 km² (15%) Pop: 4,891,025 (18%)	1. Arghakhanchi* 2. Banke 3. Bardiya 4. Dang 5. Gulmi* 6. Kapilvastu 7. Nawalparasi (west of Bardaghat Susta) 8. Palpa* 9. Pyuthan* 10. Rolpa* 11. Rukum (eastern part)* 12. Rupandehi * districts that are proposed to be re-allocated to Province Nos. 4 and 6	-	- Cattle, buffalo, goat, agro-industry and quarantine services	- Fish, poultry, bee, dairy, goat, pig, agro-industry and quarantine services
No. 6 Area: 27,984 km² (19%) Pop: 1,168,515 (4%)	Proposed name for the 1. Dailekh 2. Dolpa 3. Humla 4. Jajarkot 5. Jumla 6. Kalikot 7. Mugu 8. Rukum (western part) 9. Salyan 10. Surkhet	- Yak, sheep and chyangra	- Cattle, buffalo, goat and cottage agro-industries	-
No. 7 **Area**: 19,539 km² (13%) **Pop**: 2,552,517 (10%)	1. Achham 2. Baitadi 3. Bajhang 4. Bajura 5. Dadeldhura 6. Darchula 7. Doti 8. Kailali 9. Kanchanpur	- Medicinal herbs, dairy, yak/chauri, sheep and chyangra	- Cattle, buffalo and goat	- Cattle, buffalo, dairy and agro-industries, and quarantine services

Note: Figures in parentheses are percentage of total area and population.
Source: https://en.wikipedia.org/wiki/Nepalese_Federal_States accessed on 1 July 2017 for province, area, population and districts.

The HR for provinces should be managed to match the peculiarity of physiography, rainfall pattern, climatic regime, water resources, biodiversity and physical area.

2.3. Functional analysis in three tiers of government

Three tiers of government namely -the Federation (1), the Province (*pradesh* - 7) and the Local (744) consisting Rural-municipalities/*gaunpalika* (481) and Municipalities (263) with Metropolitan City (6), Sub-metropolitan City (11), and Municipality (246) with 6,560 wards at local levels has the following functional responsibility for livestock development.

Federal level

i. Policy (National)
    - Livestock / Agriculture
    - Land use
    - Irrigation
    - Cooperative
    - Insurance

ii. Coordination and communication
    - Aid
    - Grant
    - Commitments and obligations
    - Province

iii. Legal provisions
iv. Quarantine
v. Quality assurance and standard setting
vi. Survey, surveillance and response
vii. Reference laboratory and veterinary hospital services
viii. Environment management (land use, pollutant, pesticides, drugs and effluents)
ix. Engagement
    - Education
    - Extension
    - Research institutions
    - Cooperative

x. International trade
xi. Data and statistics
xii. Research, training and development

Provincial level

i. Policy (Provincial)
ii. Plan formulation for livestock and infrastructure development
iii. Program and projects formulation and implementation
iv. Coordination and communication
    - Plan
    - Budget
    - Commitments and obligations
    - Federal and local

v. Regulatory
vi. Quality assurance and standard setting for inputs and outputs
vii. Survey, surveillance and response

viii. Referral laboratories and veterinary hospital services
ix. Research farms and centers
x. Environment management (land use, vet drugs and pesticides, and effluents)
xi. Engagement
    - Education
    - Extension
    - Research institutions
    - Cooperative
xii. Data and statistics
xiii. Research and development
xiv. Industrialization and domestic trade
xv. Food security
xvi. Sectoral training and development

Local level

i. Specific (micro/productivity) policy/plan
ii. Program and projects formulation for livestock and infrastructure development
iii. Implementation of programs, projects and provisions
iv. Coordination and communication
    - Local elected bodies
    - Clients (farmers, traders, entrepreneurs, consumers)
    - Line agencies
    - Communities
v. Management
    - Input (seed, breed, raw materials)
    - Output
    - Infrastructure (people, market, machinery, equipment and technology)
    - Natural and other resources
    - Insurance
    - Financial support
    - Supply chain (inventory, preservation and packaging)
    - Information and communication technology
vi. Processing and value addition
vii. Extension
    - Training
    - Demonstrations
    - EIC (education, information and communication)
    - Organizations of beneficiary groups

    Market and marketing
viii. Engagement
    - Beneficiary organizations and groups

- Related line agencies
- Cooperatives
- Bank and financial institutions
- Traders
- Insurance

ix. Regulatory, quality assurance and compliance
x. Environment protection (land use, pesticides, drugs and effluents)
xi. Entrepreneurial development
xii. Survey, surveillance and response
xiii. Data and statistics
xiv. Basic laboratory and veterinary hospital services
xv. Monitoring and evaluation

2.4. Major aspects of livestock and agricultural development

Consideration has also been taken for four major aspects of livestock and food safety development namely - **pre-production, production, value addition/value chain, and marketing/trading** for analyzing HR gap. Pre-production aspect mainly takes account of input management and input services, production aspect takes account of all about production processes, value addition/value chain takes account of processing and agro-industry development, and finally the marketing/trading takes account of distribution right from home consumption of farmers to trade.

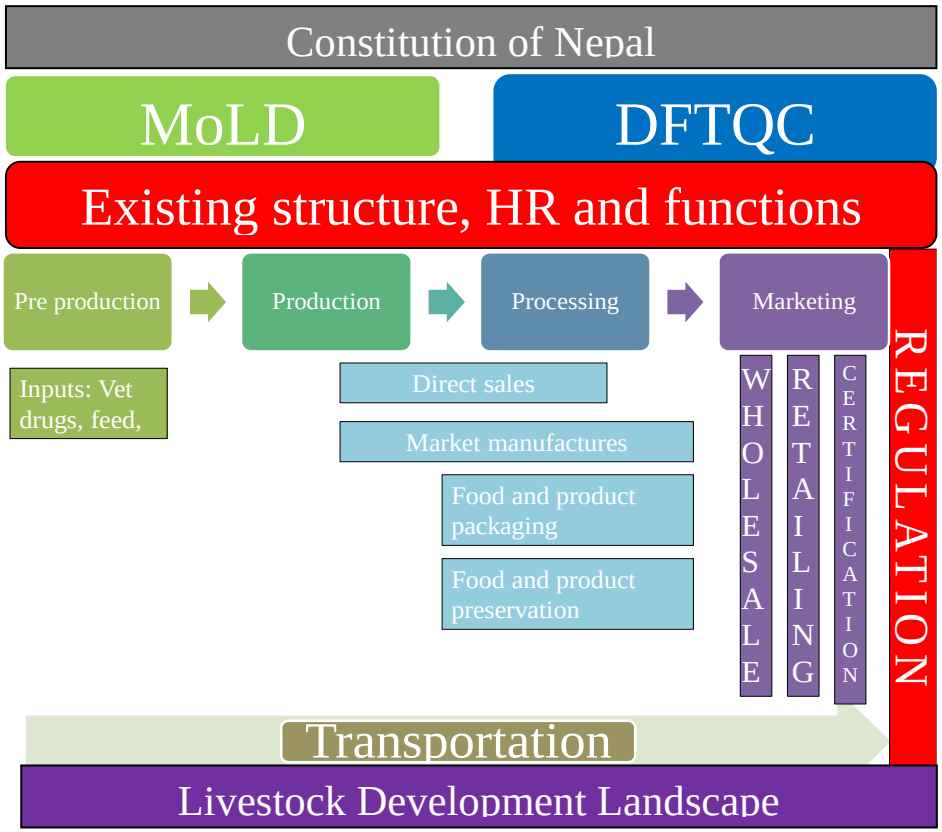
2.5. Emerging issues and problems in the livestock sector

Interaction meetings with various stakeholders, experts and experience of study team are considered to identify emerging issues and problems in the livestock sector. The dominant issues and problems expressed and identified include - diagnostic clinical services, farm enterprise for beginners, livestock farm risk management, mechanization, bioenergy, nutrition sensitive livestock raring, formulating food related policy, act and regulation. Furthermore, basic and strategic research on biotechnology, bioengineering, new emerging technology, risk analysis and biosecurity, harmonization of laws, standards, food export/import procedures, international trade practices, quarantine services, efficient laboratory services and epidemiological database with international systems, code of hygienic practices and guidelines, etc. are some other major observations.

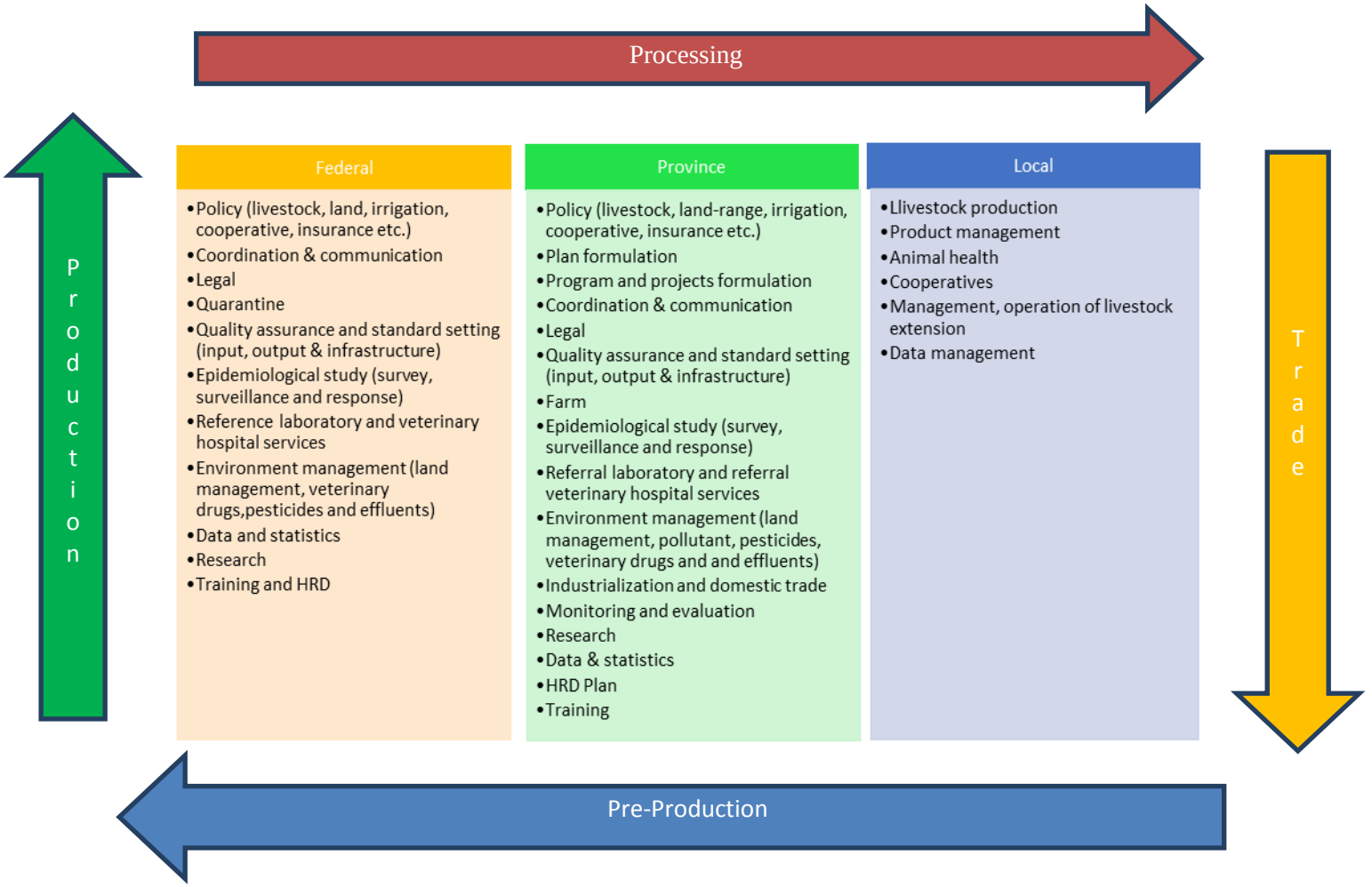
3. Description of Framework

The guiding framework has been developed and applied in the study as an analytical tool to identify HR gaps. The context, vision, objective, mandates, functions and present institutional reality have been considered during the framework design and development. Study framework and competency framework are developed and applied as analytical tools.

3.1. Study framework



3.2. Competency framework



4. Human Resource Gap

Detailed checklists were pre-tested and administered to collect information from stakeholders and HR gap analyzed in terms of academic qualification, training, experience and HR functions. Similarly, focused group discussions with farmers / farmers' groups / committees and farmers' cooperatives, agro-industrialists, consumers and traders were conducted in all sample districts to identify service expectations. The major responses were as follows:

- Weak policy, plan and programs implementation;
- Technological gaps for production, processing, product diversification and marketing;
- Unavailability of quality assured inputs in desired quantity;
- Unavailability of specialized human resource and services ;
- Inadequate laboratory services, costly animal health and AI services due to limited HR; and
- Inadequate coordination and communication among stakeholders.

The expressed gaps are further categorized into two broader domains of HR competency and HR management practice in the following sections.

4.1. Required competency

The detailed required **competency** at three tiers of government as expressed (in terms of knowledge/academic qualification, skill/training and experience) by stakeholders based upon their experience on service quality and availability are presented below:

4.1.1. Federal level

Functions	Knowledge /Academic qualification / HR type	Skill / Training	Experience
Policy formulation	- M. Sc. agri. economics and business management - HR plan expert - Policy expert - Experts for national standards for phyto-sanitary measures, food-safety measures - Organizational development expert - Research, extension, academia and farmer functional linkage and coordination expert - HR well versed in current and emerging	- Policy formulation, M&E, policy advocacy, monitoring, supervision and evaluation of policy implementation - Economic analysis, value chains and business management - Policy analysis	- Experience and expertise in economic analysis, program planning and M&E

Functions	Knowledge /Academic qualification / HR type	Skill / Training	Experience
	issues/problems coming from academic institutions		
Legal	- Master degree in law	- Training on legal drafting and legal opinion - Microsoft office	-
Harmonization of international laws or treaties or obligations or commitments	- Master degree in law Trade relations expert - livestock and food legislation and negotiations expert - VPH and food technology experts	- International relationships and international law - Foreign aid, project management, donor relations and development communication	-
Quality assurance and standard setting for inputs and services	- M.Sc. food safety - M.Sc. pharmacology - Livestock : M.Sc. economics with specialization in enterprise development	- Insurance policy - Standard setting	-
Quality assurance and standard setting for outputs	- M.Sc. food technology - M.Sc. microbiology - M.Sc. toxicology	- Standard formulation - Production management or value chain - Post-harvest handling and packaging - Setting and monitoring standards	
Quality assurance and standard setting for infrastructures (commercialized farming)	- M.Sc. civil engineering - M.Sc. irrigation engineering - Livestock market expert	- Processing facility and procedure for agro-industry development - Logistic management for market centers development (collection, storage, transportation)	-
Research	- Expert on biotechnology, bioengineering, agro-	- Conservation, promotion and	-

Functions	Knowledge /Academic qualification / HR type	Skill / Training	Experience
	industry, climate smart livestock - Fish diseases and livestock experts	utilization of NGR - Agro-processing - Climate change	
Emerging areas of specialization	- Expert on risk analysis - Nutrition expert	- Veterinary clinic and laboratory testing - Risk analysis	-
Reference laboratory and Vet hospital	- Toxicologist - Microbiologist - Biotechnologist for GMO/hybrids - Experts for lab technology, biosecurity and risk analysis, testing of samples	- Laboratory equipment operation	- Laboratory equipment operation
Coordination and collaboration	-	- Grant, aid - Inter-ministries and related agencies - Inter-provincial development plans and projects in line with national goal - International trade	-
Survey, surveillance and response	- M.Sc. epidemiology - M.Sc. public health	- Agro-meteorology - Food safety	-
Quarantine	- Experts for virology, mycology, bacteriology, residue analysis - Expert on fish quarantine and food quarantine - Fish disease expert	- WTO-SPS, TBT, - Biosecurity and risk analysis - Rapid test methods	-

Functions	Knowledge /Academic qualification / HR type	Skill / Training	Experience
Data management	- Agriculture economics	- Data analysis in national perspective and compilation, documentation, maintenance and dissemination - Special package of data management	-
Training and HRD	- Assess HR need - Prepare HRD plan - Implement HRD plan - Assess TNA - Design training - Conduct training	- M.Sc. in animal/ veterinary science, food technology	- TNA/TOT

4.1.2. Provincial level

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
Policy(Provincial)	- M. Sc. agri-economics and business management	- Econimic analysis - Policy formulation - M and E	-
Overall plans, programs and projects	- Master degree in agri-economics and rural development - M.Sc. in civil engineering agriculture engineering (irrigation, agri. road, electricity, storage, agro-industries, market centers & others) - B.Sc. natural resource management	- HRD plan - Training in planning and management	- Experience in biodiversity/conservation - Utilization plans, programs & projects
Legal	- LLB	- Training on legal drafting and legal opinion - Microsoft office	-
Specific programs	- Agriculture mechanization: master degree in agriculture engineering - Development plan: B.Sc.	- Business plan development - Agro-enterprise/agro-industry	

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
	agri. engineering or B.Sc. agri. irrigation - Expert for formulating provincial level HRD plan - M.Sc. animal nutrition/fodder and pasture M.Sc. veterinary public health, M.Sc. epidemiology - Food: M.Sc. food technology, food and nutrition, food processing engineering	development - Mechanization - Farm management - Value chain and product diversification - Biosecurity and risk analysis - Veterinary public health and zoonotic diseases - Field epidemiology - Inspection and certification - Fodder and pasture development	
Emerging areas of specialization	- B.Sc. in forestry - High-technology - mechanization, dairy, meat and food	- Climate change - Biosecurity and risk analysis	-
Referral laboratories and hospital	- M.Sc. microbiology, pathology, parasitology, serology - M.Sc. food technology - M.V.Sc. medicine, gynecology, surgery, radiology	- Lab equipment operation - Laboratory diagnosis - Standardization and calibration of equipment and glassware - Good laboratory practice - Veterinary Clinical subjects - Fish disease	- Lab equipment operation - Experience in lab analysis and management
Survey, surveillance and response	- M.Sc. epidemiology - M.Sc. V. public health/B. SC. public health	- Field epidemiology - Agro-meteorology - Food safety	-
Farms and resources centers	- Range and pasture	- Farm management - Quality seed, seed and sapling production - Maintenance of	-

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
		tools, equipment and machineries - Animal husbandry - Climate change: - Artificial insemination and embryo transfer (AI/ET)	
Research centers	- At least master degree in related discipline	- Training on related discipline	-
Coordination		- Provincial development plans and projects in line with national, inter-provincial and provincial goal - Academia and private sector	-
Training	- M.Sc. agriculture, livestock, veterinary, food technology, food and nutrition, agri. business	- Training management - Subject specific training - MToT (master training of trainers) - Managerial communication - Facilitation skills and team building - Microsoft office	- Work experience in training institutions
Data and statistics	- M.Sc. statistics/M. Sc. agri. economics	- Data compilation, analysis, documentation, maintenance and dissemination - Special package of data management	-
Domestic trade	- M.Sc. statistics/M. Sc. agri-economics	- Trade facilitation - Standard setting - Manage licensing and certification	-

4.1.3. Local level

a. Metro, Sub-metro and Municipality

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
Range land management	- Bachelor degree in land resource engineering	- Land use and management system - Range and pasture management	-
Coordination between Research, Extension and Education	-	- Coordination	-
Formulation and implementation of seed/sapling/seedling production and supply program	-	- Seed/sapling production - Quality production	-
Business plans and programs development	- Bachelor degree in food technology	- Business plan	-
New technology	- M.Sc. pashmina wool production - M.Sc. carpet wool Production - M.Sc. food technology - Mechanical engineering - B.Sc. forestry - Civil engineering - Irrigation engineering	- Use of GPS/GIS, post-harvest technology - Organic farming certification, genetic characterization and identification, biosecurity and risk management - Livestock market hub - Animal husbandry - Veterinary clinic - Pasture and fodder development - Artificial insemination (AI) /embryo transfer (ET) - Food nutrition - Value chain and	-

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
		product diversification - Mechanization	
Dissemination of technology	-	- ToT - Animal husbandry - Range and pasture - Product diversification - Breeding - Animal health care - Market and marketing - Business plan development	-
Natural resource conservation programs	-	- Biodiversity conservation - Genetic resource conservation	-
Coordination and collaboration with domestic funding sources	-	- Coordination and collaboration	-
Market infrastructure development	- Civil/structural/irrigation - Agri. engineering	- Market structure standard	
Basic/diagnostic laboratories	- Food technologist, Lab technologist - B. Sc. lab technology/ M.Sc. medical technology, M.Sc. fish pathology, M.Sc. pharmacology/M.Sc. veterinary public health	- Laboratory diagnosis - Standardization and calibration of equipment and glassware - Good laboratory practice - Inspection, testing and certification	- Lab equipment operation - Experience in lab technology - Lab analysis and handling
Veterinary Hospital	- Bachelor in veterinary science	- Clinical practice - Infertility and gynecological disorders - Surgery - Radiology - Pathology	-
Data management	- B.Sc./M.Sc. statistics	- Computer software	-

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
Agro-industry development	- Processing technology - Processing machineries	-	-
Marketing of agro-products, live animal market/wet market	- Marketing, monitoring	- Food Adulteration testing (milk and milk products, sweets, etc.) - Fish - Indigenous food	-
Inspection of Market, Industry, Hotel/ Restaurants, live animal market, Slaughterhouse	- Bachelor in food technology	- Good practices - Inspection of market, industry (Food/feed), hotel/restaurant - Inspection and certification of live market and slaughterhouse	
Livestock production / extension	- Manage input supply - Prepare inputs and outputs program - Implement - Monitor - Manage coordination	- Animal husbandry - Animal market and marketing - Biosecurity - Risk management	-

b. Rural-Municipality/*Gaunpalika*

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
Range land management	- Bachelor degree in land resource engineering	- Land use and management system - Range and pasture management	-
Coordination between related agencies		- Coordination	-
Formulation and implementation of program		- Seed/sapling production - Quality	-

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
		production and program implementation	
Business plans and programs development	- Bachelor degree in food technology	- Business plan and scheme development	-
New technology	- M.Sc. food technology	- Use of GPS/GIS, post-harvest technology - Biosecurity and risk management - Livestock market hub - Animal husbandry - Veterinary clinic - Pasture and fodder development - AI/ET - Pashmina wool production - Carpet wool production - Food nutrition - Value chain and product diversification - Mechanization	-
Dissemination of technology	-	- ToT - Animal husbandry - Range and pasture - Product diversification - Breeding - Animal health care - Market and marketing - Business plan development	-
Natural resource conservation programs	-	- Biodiversity conservation - Genetic resource conservation	-

Functions	Knowledge /Academic qualification / HR type	Skill /Training	Experience
Market infrastructure development	- Civil/structural/irrigation engineering - Agri. Engineering	- Market structure standard	-
Basic/diagnostic laboratories	- Bachelor in food technology, lab technology - B. Sc. lab technology - Veterinary public health	- Laboratory diagnosis - Standardization and calibration of equipment and glassware - Good laboratory practice	-
Veterinary Hospital	- Bachelor in veterinary science - Veterinary public health	- Clinical practice - Infertility and gynecological disorders - Surgery - Radiology - Pathology	-
Data management	- B.Sc. statistics	- Data management	-
Agro – entrepreneur/ industry development	- Bachelor in food technology	- Raw material preparation, processing, packaging - Sanitation and hygiene	-
Inspection of Market, Industry, Hotel/ Restaurants, live animal market, Slaughterhouse	- Bachelor in food technology - Marketing, monitoring	- Good practices - Inspection of market, industry (Food/feed), hotel/restaurant - Inspection and certification of live market and slaughterhouse	-

4.2. Existing HR analysis

4.2.1. Present human resource

At present, there are 4261 posts in MoLD. Some posts are unclassified (e.g. training officers, regional directors, districts chiefs, etc). A total of 450 officers and 1931 non-officers are working in DLS. Out of these 883 **(20.72 %)** posts are vacant.

(Annex 1, Table 1 and 2: Employee details)

4.2.2. Existing academic qualification

The basic qualification for entering in animal production and dairy development group (*samuha)* at Gazetted level is defined as B.Sc.Ag. (animal science) / B.Sc. (animal science)/B.Sc. dairy technology/science, B.V.Sc. and A.H. or equivalent. Likewise, it is B.V.Sc. and A.H./DVM/B.V.Sc. or equivalent for veterinary *samuha.* With relapse of service time, many of them have obtained higher degrees either through government nomination or by their own efforts, which comes about 37% (111 + 54/450) of existing veterinarian and livestock officers.

(Annex 1, Table 3 and 4: Veterinary and Livestock officers having Master's Degree and above)

However, according to the report of DLS, Foreign Aid Section (2015), there is huge deficit of higher degree holder HR.

(Annex 1, Table 5: Human resources deficit estimated by DLS, 2015)

Similarly, the basic qualification for entering at non-gazetted (NG) Cass I is JT (livestock/vet) or I.Sc. (livestock/vet)/TCL and TSLC or JTA course passed in livestock or equivalent for NG class – II.

Analysis of the available data has shown the exiting HR competencies in the MOLD system as Ph.D. (Mol. biology/cytogenetic) / Ph. D (clinical science); M.V. Sc. Vet. medicine, Parasitology, Pathology, Microbiology, Molecular Virology, Theriogenology, Pharmacology; Master in veterinary science; M. Sc. animal nutrition, Livestock extension; M. Sc. meat technology, M. Sc. dairy technology; M.Sc. (epidemiology), M.Sc. (Vet. epidemiology and economics), M.Sc. (biosecurity), Masters in veterinary public health; Master of applied science in agriculture and rural development, M.Sc. SLA; Master in animal breeding and genetics; M.Sc. (animal breeding), Life science; M.Sc. poultry disease; M.Sc. tropical animal science, Animal nutrition/ M.Sc. MPPG; M.Sc. animal science; M. Sc. (molecular biology); Masters in TVSc.; Microbiology, Avian virology; B.V. Sc. and A.H., B.V. Sc., DVM; B. Sc. Ag. (animal science), B.Sc. (animal science); M. Sc. Ag. (animal science), M. Sc. (animal science); M.Sc. Ag. (agri- economics), MA (Economics); and in non-officer level as B. Tech.; JT course/ TCL (livestock), JTA course, TSLC (livestock).

4.2.3 Training opportunities

4.2.3.1 National training

Directorate of Livestock Service Training and Extension (DLSTE) and five Regional Livestock Service Training Centers (RLSTC) are delivering different training courses to staff and farmers / entrepreneurs. The DLSTE is more focused on Officer level trainings, whereas the RLSTCs are more focused on middle level technical staff, farmer and entrepreneur trainings. The DLSTE and RLSTCs provide 26 and 31 types of trainings courses for officers and middle level technicians respectively. The RLTSTCs also

provide short-term training courses for farmers and entrepreneurs. They train about 1000 officers, farmers, entrepreneurs and other staff, annually. Data and statistics of last five years suggests that altogether 1175 officers have received trainings from DLSTE. It seems that the same officer might have exposed to various training courses whereas, some technicians have not received a single training even in 24 or 34 years of service.

(Annex 1, Table 6: Training received by technicians)

4.2.3.2 International training and exposure

Officials of MoLD have attended trainings, workshops, seminars and exposure visits in several countries like Thailand, India, China, Japan, Cambodia, Bangladesh, Sri Lanka, Mongolia, Bhutan, Pakistan, Australia, New Zealand, Korea, Egypt and some European countries which has contributed in enhancing knowledge and skills in the areas of animal health and production services.

4.3. Capacity of universities and academia

Tribhuvan University, Agriculture and Forestry University and Purbanchal University are principal universities providing degrees in Livestock / Veterinary sciences. Similarly, Central Campus of Technology, Dharan and some private colleges (under PU and TU) provides degrees in food technology. Likewise, Council for Technical Education and Vocational Training and its affiliated institutions provide education for JT/JTA's. These institutions are producing technical HR at all levels.

However, differences in universities curricula, absence of new concepts and technological aspects (such as WTO-SPS provisions, biosecurity, risk analysis, one health concepts, food safety management system, e-learning process, legal provisions, wild life diseases and managements, etc.), poor exposure to field and practices and absence of high tech laboratory facilities are critical factors impacting quality HR.

Annex 1, Table 7: Summary of the graduates from universities)

4.4. Competency gap

The competency gap detailed below is missing competencies required to be ensured in order to deliver livestock functions in the changed context with better efficacy. The gaps are detailed in terms of education, training and experience required to perform functions and scope of activities. The analysis of existing HR competency and functional expectation of MoLD in federal structure are the basis for gap identification.

a. Federal level

S.N.	Functions	Scope of Activities	Education	Training	Experience
1	Policy formulation	- Perform the policy analysis in national socio-economic context - Formulate nationwide policies for livestock and food sector development - Advocate and communicate policies with all tiers of governance - Manage monitoring and supervision for effective implementation of policies	- At least master degree in agri. economics and business management	- Policy formulation, M&E, policy advocacy, monitoring , supervision and evaluation of policy implementation - Economic analysis, Legal procedures and framework	- 5 years
2	Coordination & communication	- Ensure availability of development aid and grants in livestock and food quality and safety functions - Allocate resources - Establish communication mechanism with province, local government and stakeholders	-	- Grant, aid - Inter-ministries and related agencies - Inter-provincial development plans and projects in line with national goal - International trade	- 3 years
3	Harmonization of international laws or treaties or obligations or commitments	- Review of document - Drafting of document - Notification - Implement	- Master degree in law (LLM)	- International relationships and international law - Foreign aid, project management, donor relations and development communication	-
4	Quality assurance and standard setting	- Perform need analysis - Review of documents - Drafting of document - Communicate and ensure their use	- M.Sc. food safety - M.Sc. pharmacology - M.Sc. economist - M.Sc. toxicology	- Insurance policy - Standard setting (from farm to fork)	-

S.N.	Functions	Scope of Activities	Education	Training	Experience
5	Quality assurance and standard setting for infrastructures	- Perform need analysis - Review of documents - Design and estimate - Supervise	- M.Sc. civil engineering - M.Sc. irrigation engineering - Livestock market expert - M. Sc. food technology	- Processing facility and procedure for agro-industry development - Logistic management for market centers development (collection, storage, transportation)	-
6	Research	- Need assessment - Design research - Allocate resources - Conduct research - M and E - Communicate the research outputs	- M.Sc. on biotechnology, bioengineering	- Research methodology, emerging technology, equipment operation, - Conservation, promotion and utilization of NGR - Agro-processing - Climate change - Fish diseases - Biodiversity	-
7	Reference laboratory and veterinary hospital services	- Perform lab testing - Risk analysis - Reporting - Perform examination and treatment	- M.SC. Toxicologist, Microbiology, Biotechnology	- Laboratory equipment operation - Biosecurity and risk analysis, Lab diagnosis - Veterinary clinic and laboratory testing	-
8	Epidemiology (Survey, surveillance and response)	- Perform survey and surveillance, - forecast risk - provide early warning - Prevent and control	- M.Sc. epidemiology - M.Sc. public health	- Agro-meteorology - Food safety	-
9	Quarantine	- Perform inspection and test - Analyze risk - Certification	- Experts of virology, mycology, bacteriology, residue analysis - Experts of fish and food quarantine and fish disease	- WTO-SPS, TBT, - Biosecurity and risk analysis - Rapid test methods	
10	Data management	- Develop national database - Communicate reports and results	- Agriculture economics	- Data analysis in national perspective and compilation, documentation,	-

S.N.	Functions	Scope of Activities	Education	Training	Experience
				maintenance and dissemination - Special package of data management	
11	Training and HRD	- Assess HR need - Prepare HRD plan - Implement HRD plan - Assess TNA - Design training - Conduct training	- M.Sc. in animal/ veterinary science, food technology	TNA, TOT	-

b. Provincial level

S.N.	Functions	Scope of Activities	Education	Training	Experience
1	Policy formulation (Provincial)	- Formulate provincial livestock development policy - Communicate with all tiers of government - Implementation - M and E	- M. Sc. agri-economics and business management	- Economic analysis - Policy formulation - M and E	-
2	Overall plans, programs formulation	- Formulate livestock development plan and program - Communicate with local government - M and E	- Master degree in agri-economics	- Biodiversity/conservation - Utilization plans, programs & projects - HRD plan - Training in planning and management	-
3	Legal	- Drafting - Communicate	- Bachelor degree in law	- Training on legal drafting and legal opinion - Microsoft office	-
4	Wool and pashmina	- Assess demand - Prepare program - Implement - Communicate	- M.Sc. pashmina wool production technology - M.Sc. carpet wool production technology	- Wool/pashmina collection, processing and trading	-
5	Referral laboratories and veterinary hospital services	- Perform lab testing - Risk analysis - Reporting - Perform examination and treatment	- M.Sc. microbiology, pathology, parasitology, serology - M.Sc. food technology - M.V. Sc. medicine,	- Lab equipment operation - Lab analysis and management - Laboratory diagnosis - Standardization and calibration of equipment and glassware - Good laboratory practice - Veterinary clinical	- 4 years

S.N.	Functions	Scope of Activities	Education	Training	Experience
			gynecology, surgery, radiology	subjects - Fish disease	
6	Survey, surveillance and response	- Perform survey and surveillance, - Forecast risk - Provide early warning - Prevent and control	- M.Sc. epidemiology - M.Sc. V. public health /B. SC. public health	- Field epidemiology - Agro-meteorology - Food safety	-
7	Farms and resources centers	- Prepare program - Allocate resources - Production - Implement - Distribution	- M.Sc. in forage pasture and range management	- Farm management - Quality seed and sapling production - Maintenance of tools, equipment and machineries - Animal husbandry - Climate change - Artificial insemination and embryo transfer (AI/ET) - Farm mechanization	-
8	Research centers	- Need assessment - Design research - Allocate resources - Conduct research - M and E - Communicate the research outputs	- At least master degree in related discipline	- Training on related discipline	-
9	Coordination and collaboration	- Engage line agencies - Ensure availability of budget - Establish communication among local, other provincial and federal	-	- Communication management	-
10	Training	- Prepare resource person roster - TNA - Design training - Develop training manual - Conduct training - Perform impact assessment	- M.Sc. livestock, veterinary, food technology, food and nutrition	- MToT (master training of trainers) - Managerial communication - Facilitation skills and team building - Microsoft office	- 3 years' experience in training institutions
11	Data and statistics	- Develop provincial	- M.Sc. statistics/M.	- Data compilation, analysis, documentation,	-

S.N.	Functions	Scope of Activities	Education	Training	Experience
		database - Communicate reports and results to federal and local government	Sc. agri-economics	maintenance and dissemination - Data management package	
12	Domestic trade	- Interprovincial coordination and collaboration - Perform standard setting - Licensing and certification - M and E	- M.Sc. statistics/M. Sc. agri-economics	- Trade facilitation - Standard setting - Manage licensing and certification	-

c. Local level

i. Metro, Sub-metro and Municipality

S.N.	Functions	Scope of Activities	Education	Training	Experience
1	Range land management	- Prepare inventory of the range land and pasture - Plan for range land management and pasture development	- Bachelor degree in land resource engineering	- Land use and management system - Range and pasture management	-
2	Coordination among research, extension and academic institutions	- Engage line agencies - Ensure availability of budget based on program - Establish communication	-	- Coordination - Communication	-
3	Formulation and implementation of animal health and production program	- Formulate program - Implement - Coordinate - Facilitate for distribution of inputs	-	- Seed/sapling production - Supply management - Quality production - Animal health - Inputs	-
4	Business plans and programs development	- Assess demand - Prepare business plan - Communicate	- Bachelor degree in food technology	- Business plan - Program development training	-
5	New	- Assess demand	- Bachelor in food	- Use of	-

S.N.	Functions	Scope of Activities	Education	Training	Experience
	technology	- Prepare program - Implement - Communicate	technology	GPS/GIS, post-harvest technology - Organic farming certification, genetic characterization and identification, biosecurity and risk management - Livestock market hub - Animal husbandry - Veterinary clinic - Pasture and fodder development - AI/ET - Food nutrition - Value chain and product diversification - Mechanization - Pasmina wool and carpet wool	
6	Livestock production/ extension	- Manage input supply - Prepare inputs and out puts program - Implement - Monitor - Manage coordination	-	- ToT - Animal husbandry - Range and pasture - Product diversification - Breeding - Animal health care - Market and marketing - Business plan development	-
7	Natural resource conservation programs	- Identify the local resources - Prepare program for conservation - Implement	-	- Biodiversity conservation - Genetic resource conservation	-
8	Coordination and collaboration with stakeholders	- Coordination and collaboration - Communication	-	- Coordination and collaboration	-

S.N.	Functions	Scope of Activities	Education	Training	Experience
9	Market infrastructure development	- Identify the local market - Prepare program - Implement - Coordinate	- Civil/structural/irrigation engineer	- Market structure standard	-
10	Basic/ diagnostic laboratories	- Collect and prepare samples - Analyze - Report	- Bachelor in food technology, lab technology - B. Sc. lab technology - M.Sc. fish pathology, M.Sc. veterinary public health	- Laboratory diagnosis - Lab equipment operation - Standardization and calibration of equipment and glassware - Good laboratory practice - Inspection, testing and certification	-
11	Veterinary hospital services	- Examine - Diagnose - Treat	- Bachelor in veterinary science	- Clinical practice - Gynecological disorders - Surgery - Pathology	-
12	Data management	- Develop local database - Communicate reports and results to provincial government	- M. Sc. statistics	- Data management package	-
13	Agro-industry development	- Assess needs - Prepare program - Coordinate - Communicate	- Bachelor in food technology	- Processing technology - Processing machineries -	-
14	Marketing of agro-products, live animal market/wet market	- Inspect - Conduct need based training - Prepare program - Coordinate - Communicate	- Bachelor in food technology	- Inspection - Adulteration testing (milk and milk products, sweets, etc.) - Sanitation and hygiene	-
15	Inspection of market, industry, hotel/ restaurants, live animal market, slaughterhouse	- Inspect - Conduct need based training - Prepare program - Coordinate - Communicate	- Bachelor in food technology	- Good practices - Inspection of market, industry (Food/feed), hotel/restaurant - Inspection and certification of live market and slaughterhouse	-

ii. Rural Municipality/Gaunpalika

S.N.	Functions	Scope o f Activities	Education	Training	Experience
1	Range land management	- Prepare inventory of the range land and pasture - Plan for range land management and pasture development	- Bachelor degree in land resource engineering	- Land use and management system - Range and pasture management	-
2	Coordination among research, extension and academic institutions	- Engage line agencies - Ensure availability of budget based on programs - Establish communicatio n	-	- Coordination - Communicati on	-
3	Formulation and implementation of program	- Formulate program - Implement - Coordinate - Facilitate for distribution of inputs	-	- Seed/sapling production - Quality production - Inputs	-
4	Business plans and programs development	- Assess demand - Prepare business plan - Communicate	-	- Project management	-
5	New technology	- Assess demand - Prepare program - Implement - Communicate	- Bachelors in food technology	- Use of GPS/GIS, post-harvest technology - Biosecurity and risk management - Livestock market hub - Animal husbandry - Veterinary clinic - Pasture and fodder development - AI/ET - Pashmina wool production - Carpet wool production - Food nutrition - Value chain and product diversification	-

S.N.	Functions	Scope o f Activities	Education	Training	Experience
				- Mechanization	
6	Livestock production/ extension	- Manage input supply - Prepare inputs and outputs program - Implement - Monitor - Manage coordination	-	- ToT - Animal husbandry - Range and pasture - Product diversification - Breeding - Animal health care - Market and marketing - Business plan development	-
7	Coordination and collaboration between/among other stakeholder	- Coordination and collaboration - Communication	-	- Coordination and collaboration	-
8	Natural resource conservation programs	- Identify the local resources - Prepare and implement program for conservation	-	- Biodiversity conservation - Genetic resource conservation	-
9	Market infrastructure development	- Identify the local market - Prepare program - Implement and coordinate the development	- Civil/structural/irrigation engineer	- Infrastructure standards for market development	-
10	Basic/ diagnostic laboratories	- Collect and prepare samples - Analyze - Report	- Bachelor in food technology, B. Sc. lab technology /pathology	- Laboratory diagnosis - Standardization and calibration of equipment and glassware - Good laboratory practice - Inspection, testing and certification	- Lab equipment operation - Lab analysis and handling
11	Veterinary hospital services	- Examine - Diagnose - Treat	- Bachelor in veterinary science - M. Sc. veterinary public health - M. Sc. surgery	- Clinical practice - Gynecological disorders - Surgery - Pathology	-
12	Data management	- Develop local data base	- M.Sc. statistics	- Data management	-

S.N.	Functions	Scope o f Activities	Education	Training	Experience
		- Communicate reports and results to provincial government		package	
13	Agro-entrepreneur/industry development	- Assess needs - Prepare program - Coordinate - Communicate	- Bachelor in food technology	- Processing technology - Processing machineries - Traditional food promotion	-
14	Marketing of agro-products, live animal market/wet market	- Inspect - Conduct need based training - Prepare and implement program	- Bachelor in food Technology	- Inspection - Adulteration testing (milk and milk products, sweets, etc.) - Sanitation and hygiene	-
15	Inspection of market, industry, hotel/ restaurants, live animal market, slaughterhouse	- Inspect - Conduct need based training - Prepare and implement program	- Bachelor in food technology	- Good practices - Inspection of market, industry (food/feed), hotel/restaurant - Inspection and certification of live market and slaughterhouse	-

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Annex - I: List of Tables

Table 1: Employee details

S.N.	Level	Number
1	Gazetted Special Class	0
2	Gazetted First Class	18
3	Gazetted Second Class	136
4	Gazetted Third Class	606
5	Non-gazetted First Class	1282
6	Non-gazetted Second Class	746
7	Typist	38
8	Driver	86
9	Office assistant	1349
	Total	**4261**

Source: MoLD, 2017; DLS, 2072/2073; and DLS, 2073.

Table 2: Veterinary and livestock officers

S.N.	Post	Number
1	Chief veterinary officer	10
2	Senior veterinary officer	57
3	Veterinary officer	224
4	Chief livestock officer	8
5	Senior livestock development officer	50
6	Livestock development officer	101
	Total	**450**

Source: MoLD, 2017; DLS, 2072/2073; and DLS, 2073.

Table 3: Veterinary officers having Master's Degree and above

S.N.	Name of the degree	Number
1.	Master in Veterinary Science	37
2	M.Sc. (Animal Nutrition)	17
3	M.Sc. (Animal Science)	19
4	M.Sc. (Meat Technology)	13
5	M.Sc. (Animal Breeding)	3
6	M.Sc. (Epidemiology)	3
7	Master in VPH	3
8	M.Sc. (Dairy Technology)	5
9	M.Sc. (Molecular Biology)	2
10	M.Sc.(Poultry Disease and Environment Management)	2
11	M.Sc. (Parasitology)	2

12	MVM (Biosecurity)	1
13	M.Sc. (Life Science)	1
14	M.S. in Vet Science	1
15	Ph. D. (Molecular Biology/ Cytogenetics)	1
16	Ph. D. (Microbiology)	1
	Total	111

Source: Veterinarian's Directory, 2016

Table 4: Livestock officers having Master's Degree and above

S.N.	Name of Degree	Number
1	M.Sc. Animal Nutrition	20
2	M.Sc. Animal Breeding	5
3	M.Sc. Dairy Technology	8
4	M.Sc. Animal Science (SLA)	13
5	M.Sc. Pasture	1
6	M.Sc. Animal Science (LPM)	5
7	M.Sc. Animal Science (Poultry Science)	2
	Total	54

Source: DLS, 2071

Table 5: Human resources deficit estimated by DLS, 2015

S.N.	Name of Degree	Number
1	M.V. Sc. Veterinary Epidemiology	7
2	M.V. Sc. Veterinary Pathology	5
3	M.V. Sc. Veterinary Microbiology	2
4	M.V. Sc. Gynecology/ Reproductive Physiology	3
5	M.Sc. Tropical Veterinary Medicine	8
6	M.Sc. Meat Technology/ Meat Science	75
7	M.Sc. Public Health	3
8	M.Sc. Virology	5
9	M.Sc. Feed Stuff Analysis	6
10	M.Sc. Pasture and Range Land Management	10
	Total	124

Source: DLS, Foreign aid and administration sections 2015

Table 6: Training received by technicians

		Times of 7 days training attended											Total
		0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	10.00	12.00	
Years of service in the current organization	1.00	6	5	0	0	0	0	0	0	0	0	0	11
	3.00	0	1	1	1	0	0	0	0	0	0	0	3
	4.00	0	0	0	0	1	0	0	0	0	0	0	1
	6.00	1	0	0	0	1	0	0	1	0	0	0	3
	7.00	0	0	0	0	1	0	0	0	0	0	0	1
	8.00	0	0	0	0	1	0	0	0	0	0	0	1
	10.00	1	0	0	0	0	0	0	0	0	0	0	1
	11.00	0	0	0	0	0	0	0	0	0	0	1	1
	13.00	1	1	1	0	0	0	0	0	0	0	0	3
	14.00	2	3	1	1	0	0	0	0	0	0	0	7
	16.00	0	0	0	0	0	1	0	0	0	0	0	1
	17.00	0	2	2	2	0	2	1	0	0	0	0	9
	18.00	3	7	6	2	0	0	1	0	1	0	0	20
	19.00	2	1	0	1	0	1	0	0	0	0	0	5
	21.00	0	0	1	0	0	0	0	0	0	0	0	1
	23.00	1	4	0	2	0	1	0	0	0	0	0	8
	24.00	4	3	3	1	1	0	0	0	0	0	0	12
	28.00	0	2	1	0	0	0	0	0	0	0	0	3
	29.00	0	0	1	0	0	0	0	0	0	0	0	1
	30.00	1	0	0	0	1	0	0	0	0	0	0	2
	31.00	2	3	1	1	0	0	0	0	0	1	0	8
	32.00	1	0	0	0	0	0	0	0	0	0	0	1
	34.00	0	1	0	0	0	0	0	0	0	0	0	1
Total		**25**	**33**	**18**	**11**	**6**	**5**	**2**	**1**	**1**	**1**	**1**	**104**

Years of service in the current organization * Attended seven days duration training Cross-tabulation

Source: 1. Field survey

2. DLSTE, 2017 (unpublished). Received by personal communication

Table 7: Summary of the graduates from universities

University	B. V. Sc. and AH	M. V. Sc.	M. Sc. A. Sc.	M. Sc. Meat Tech.	M.Sc. Dairy Tech.	B. Sc. Fisheries	M. Sc. Fisheries
TU	50	8	20-25	0	0	15	15
AFU	52	19	14	0	0	16	5
PU	80	0	0	30	30	0	0
Total	**182**	**27**	**34-39**	**30**	**30**	**31**	**20**
University	**PhD Vet**	**PhD Fisheries**	**PhD A. Sc.**				
AFU	2	4	3				
TU	0	0	0			-	
Total	**2**	**4**	**3**				

University	Bachelor in food tech.	Bachelor in nutrition and dietetics	Bachelor in food and dairy tech.	Masters in food tech.	Masters in nutrition and dietetics
TU	80	20	0	12	0
PU	0	0	20	0	10
Total	**80**	**20**	**20**	**12**	**10**

Annex - II:
Need Assessment/Questionnaire/Interview/Discussion Checklist

Semi-structured FGD Questionnaire for Input and Output Traders and Agro-industries (Livestock)

(Identification of human resource gap at traders and agro-industry level)

1. INPUT SUPPLY

101. Please specify major problems encountered in inputs supply / trade:

Trading inputs	Major problems encountered	Your suggestions to overcome problems
a. Fodder and pasture seeds		
b. Fodder sapling		
c. Vet drugs/ chemicals		
d. Equipments (Vet/ Farm)		
e. Farm machinery & equipment		
f. Others (specify)		

2. PRODUCTION PHASE

201 **Please specify major problems encountered in production and trading / marketing of livestock products and machineries**

Production of	Major problems encountered	Your suggestions to overcome problems
a. Dairy products - ghee, yogurt, makhan		
b. Meat products – dry meat, sausage, frozen meat		
c. Milk can, Chilling vat etc		
d. Others (if any)		

3. AGRO-INDUSTRIES

301. Please specify major problems encountered in agro-industry (dairy/Meat/egg) development:

Component of agro-industry	Major problems encountered	Your suggestions to overcome problems
a. Quality and safe raw materials (meat/ milk/egg)		
b. Processing technology know how		
c. Information about processing machineries		
d. Others (specify)		

4. OUTPUT TRADE

401. Please specify major problems encountered in output trade:

Traded outputs	Major problems encountered (better be specific)
a. Raw milk selling	
b. Raw meat selling	
c. Eggs selling	
d. Wool selling	
e. Forage/ Pasture seeds selling	
f. Table fish	
g. Others (specify)	

Semi-structured FGD Questionnaire for Livestock Farmers' group/Committee/ Farmers' cooperatives

(Identification of human resource gap at farmer's level)

1. PRE-PRODUCTION PHASE

102. Is land resource (in terms of ownership, size, shape & distribution/scatter) appropriate for commercialized livestock production system?

Appropriate ☐ Inappropriate ☐

If inappropriate:

Why inappropriate	What are your suggestions to overcome

103. Please indicate major problems encountered related to the availability of following inputs

Activities	Major problems encountered	
a. Forage seed production & supply		
b. Fodder tree sapling production & supply		
c. Pasture seed supply		
d. Irrigation / water management for forage and pasture development		
e. Veterinary drugs/pesticides		
f. Livestock Insurance		
g. Breeds/ Animal resource centers		
h. Livestock credit		
i. Breeding animals / semen		
j. Farm labor		
k. Machinery & equipment		

2. PRODUCTION PHASE

201. Problems encountered in livestock production and types of human resources required:

Production	**Problems encountered**	**Suggestions for services to overcome problems**
a. Forage/ fodder/ pasture production and management		
b. Feed or feed ingredients supply		
c. Breeding: Artificial insemination/ natural breeding/ Embryo transfer		
d. Livestock management (Farm registration, water, shed, pen, etc)		
e. Health care : Vaccination		
• Drenching		
• Disease identification		
• Specialized treatment		
f. Organic livestock farming		
g. Quality assurance		
h. Storage and transportation		
i. Livestock enterprise / business plan developing		
j. Others (specify)		

202. Your need for new livestock production technology:

Existing technology and services	**Need for new technology**
1. Animal health	
2. Feeds and fodder	
3. Breeds and breeding	
4. Management (housing, water, manure / waste, etc.	
5. Market development and marketing (including wool / pashmina, leather/ skin)	

203. Adequacy of livestock production and health extension services:

Adequate ☐ Inadequate ☐

If inadequate, what are those inadequate extension services and your suggestions to overcome?

What are inadequate extension services	Your suggestions to overcome
1.	1.
2.	2.
3.	3.
4.	4.

3. VALUE ADDITION/PROCESSING PHASE

301 Problems and HR needed for milk and meat product diversification:

Problems in product diversification	Type of HR needed
1.	
2.	
3.	

4. TRADING / MARKETING PHASE

402. In which subject/aspect do you need training?
If training needed, please specify the training subject

Subject/aspect for training	Please tick for training
1. Meat/ milk/ egg product processing and diversification	
2. Equipment's operation (milking machine, dairy/ meat - equipment's, forage harvester, etc)	
3. Packaging and labeling of the diversified products	

Semi-structured PRA Questionnaire for Federal Level Institutions (Livestock)

(Identification of human resource gap at federal level)

1. PRE-PRODUCTION PHASE

104. Adequacy of human resources (HR) for designing livestock policy & legal frameworks:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of HR needed?

Policy steps	Suggestions for types of HR needed
Problem analysis and policy / laws formulation	
Policy advocacy	
Monitoring & supervision of policy/ laws implementation	
Evaluation of policies /laws	

105. HR need for quality assurance and standard setting for inputs:

(HR need for regulatory frameworks for including inspection, certification, licensing, code of practices for livestock-industries, risk analysis and bio-security services)

Inputs	Required HR competencies	HR need for <u>output/product</u> quality assurance and standard setting
Standard setting		
Biosecurity services		
National Risk analysis core group		
Inspection and certification (Live animal/ raw animal products)		
Inspection and certification (drugs/pesticides/ vaccines/ seeds)		
Equipments		

106. HR need for quality assurance and standard setting for infrastructures for commercialized livestock farming:

Infrastructures	**HR need for process quality assurance and standard setting**	**HR need for output quality assurance and standard setting**
Land development		
Water source / Irrigation & drainage		
Electrification		
Agriculture roads		
Agro-industries (Meat /dairy/eggs/ forage and pasture seeds, etc)		
Market centers (collection, transportation, chilling centers, wet markets)		
Others (specify)		

107. HR need for research:

Major & emerging sectors	**HR need for process quality assurance and standard setting**	**HR need for output quality assurance and standard setting**
Basic & strategic farm research		
Biotechnology and bioengineering		
Mechanization		
Agro-industries		
Conservation, promotion & utilization of genetic resources		

108. Adequacy of HR for coordinating and collaborating with development (foreign) partners for securing grants/aid/loan for livestock development programs and projects:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

109. Adequacy of HR for harmonizing international laws or treaties or obligations or commitments:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

2. PRODUCTION PHASE

201. Adequacy of HR for coordinating and collaborating with provincial governments for designing livestock development programs and projects in line with national goal:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

202. HR need for animal quarantine, epidemiological investigation, surveillance, early warning, veterinary public health and laboratory diagnosis process to control/eradication of animal diseases and quality assurance:

Core activities	Required competencies
Animal quarantine	
Risk analysis	
Epidemiological study, disease surveillance, AHMIS ,early warning system and control / eradication	
Diagnostic veterinary laboratory	
Vaccine production laboratory	
Veterinary public health service (for QA and zoonotic disease control)	
Veterinary drug administration and quality assurance	
Climate change	

3. VALUE ADDITION/PROCESSING PHASE

301. Adequacy of HR for meat inspection and certification at the slaughterhouse

Adequate Inadequate

If inadequate, what are the types of human resources required?

Types of human resources required	Required competencies

4. MARKETING/TRADE PHASE

401. Adequacy of HR for setting and monitoring of application of standards at collection center, wet market, transportation and storage in meat/ dairy/ egg sub- sectors:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

402. Adequacy of HR for compilation, disseminating and maintaining livestock statistics (population, production, consumption and trade):

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

403. Adequacy of HR for HRD and business plan development:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required?

Types of human resources required	Required competencies

Semi-structured PRA Questionnaire for Local Level Institutions (Livestock production)

(Identification of human resource gap at local level)

1. PRE-PRODUCTION PHASE

101. Adequacy of HR for coordinating with line and other agencies for livestock production inputs (vet drugs, pesticides, liquid nitrogen, semen, credit, insurance, forage and pasture seeds) for commercialized livestock production system:

Appropriate and adequate ☐ Inappropriate and inadequate ☐

If inappropriate and inadequate:

Why inputs are		Your suggestions for overcoming	
	Adequate / Inadequate	**Inappropriate**	**Inadequate**
Vet drugs and pesticides, equipment's			
Liquid nitrogen and semen			
Credit and insurance			
Forage and pasture seeds/ saplings			

What are the types of human resources required to implement the suggestions:

102. Is land resource appropriate and adequate for commercialized forage/ fodder and pasture production system:

Appropriate and adequate ☐ Inappropriate and inadequate ☐

If inappropriate and inadequate:

Why land resource is		Your suggestions for overcoming	
Inappropriate	**Inadequate**	**Inappropriate land**	**Inadequate land size**

What are the types of human resources required to implement the suggestions:

103. Adequacy of human resources for formulating and implementing pasture /forage- fodder seed/sapling/seedling production program:

Adequate ☐ Inadequate ☐

If inadequate, what are the required competencies?

Activities	**Required competency**
a. Seed production	
b. Sapling production	
c. Seed/sapling/seedling supply management	

104. Adequacy of human resources for making best use of water resources plan for livestock and pasture/ forage production and management:

Adequate ☐ Inadequate ☐

If inadequate, what are the required competencies of human resource:

Types of irrigation	**Required competency of human resource**
a. Surface water irrigation	
b. Ground water irrigation	

105. Adequacy of HR for developing livestock business plans and programs:

Adequate ☐ Inadequate ☐
If inadequate, what are your suggestions:

2. PRODUCTION PHASE

201. Adequacy of human resources for implementing AI/ET/ NI programs

Adequate ☐ Inadequate ☐

If inadequate, what are the required competencies of human resource for making it successful?

202. Demand for new production and health technology and types of human resources required:

Production activities	New technology demanded	Type/competency of human resource required
a. Genetic resource conservation		
b. Health care: Special treatment		
c. Epidemiological investigation/ disease surveillance		
d. Early disease detection/ Preventive measures / control		
e. Risk assessment and management / Biosecurity for quality assurance		
f. Livestock management		
g. Organic farming		
h. Fish disease identification and control		

203. Adequacy of HR to run diagnostic veterinary laboratories at local level:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required?

Diagnostic laboratories	Types of human resources required
Basic laboratories	
BSL-II level lab	

204. Adequacy of HR for coordinating research, extension and education at local level:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required and coordination mechanism to be adopted for this purpose?

Human resources required:

Coordination mechanism to be adopted for this purpose:

205. Adequacy of HR for disseminating need based technology at local level:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for major extension activities:

Major extension activities	**Types of human resources required**
1.	
2.	
3.	
n.	

206. Adequacy of HR for natural resource conservation (biodiversity):

Appropriate ☐ Inadequate ☐

If inadequate, what are the types of human resources required and their competencies?

207. Adequacy of existing HR for coordinating and collaborating with funding agencies (e.g. provincial government, local government, NGOs, INGOs, private sectors etc.) for livestock development programs and projects?

Appropriate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose?

208. Adequacy of human resources for discouraging *overuse, misuse and abuse* of veterinary drugs /pesticides:

Adequate ☐ Inadequate ☐

If inadequate, what are the required competencies of human resource for making bio-pesticide?

209. Major problems encountered in mechanization in livestock industry:

Competency of human resources for promoting mechanization in livestock production:

Adequate ☐ Inadequate ☐

If inadequate, what are your suggestions?

3. VALUE ADDITION/PROCESSING PHASE

301. Adequacy of HR for providing new technologies on livestock product diversification at local levels

Adequate Inadequate

If inadequate, what are the types of human resources required and their competencies?

Type of HR	**Required competencies**

4. TRADING/MARKETING PHASE

401. Adequacy of HR for Veterinary inspection and certification of livestock at the farm and live market levels

Adequate Inadequate

If inadequate, what are the types of human resources required and their competencies?

Type of HR	**Required competencies**

402. Adequacy of HR for inspection at milk value chain of the livestock commodities (raw milk at collection center, chilling center, storage and transportation) up to the industry- gates.

Adequate Inadequate

If inadequate, what are the types of human resources required and their competencies?

Type of HR	Required competencies

403. Adequacy of HR for meat inspection and certification at the slaughterhouse

Adequate Inadequate

If inadequate, what are the types of human resources required and their competencies?

Type of HR required	Required competencies

404. Adequacy of HR for market infrastructure development (planning for collection center, chilling centers, market hub, transportation and waste management - their structural design and standards):

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose?

405. Adequacy of HR for communication/ dissemination of market information, livestock information to the stakeholders (price, sales quantity, quality and physical market):

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose?

5. MONITORING, SUPERVISION, REPORTING AND LOCAL COORDINATION

501. Adequacy of HR for monitoring, supervision, reporting and local coordination of the veterinary/ livestock programs at local level and provincial level

Adequate Inadequate

If inadequate, what are the types of human resources required and their competencies?

Type of HR required	Required competencies

Semi-structured PRA Questionnaire for Province Level Institutions

(Livestock development)

(Identification of human resource gap at province level)

1. FOR ALL PHASES

101. HR need for provincial level livestock sector policy/plans/programs/projects and budget:

HR need for	**Types of human resources required**
Preparation of province level land management policy /plan	
Securing resources from federal and local governments and other sources	
Coordinating with federal, other province & local governments for bio-diversity and genetic conservation & utilization plans, programs & projects	
Planning, coordination, monitoring, supervision and evaluation of province level livestock sector development plan, program and budget	
Planning & budgeting for agro-industries & mechanization	
Establishment of diagnostic laboratories	
Coordinating research, extension & education institutions for latest emerging technology	
Commercialization technology for livestock development	
Coordinating supply of inputs (Vet drugs, forage and pasture seeds, pesticides, credit, insurance etc.)	
Coordinating, implementing & monitoring of survey / surveillance & risk management plans, programs & projects set by federal level	
Coordinating physical infrastructure development plans & projects (wet / live , market, road, electricity, storage, agro-industries, market centers & others)	
Implementing animal disease control/ eradication programs/projects with federal and other province	
Adequacy of HR for compilation & maintenance of Livestock statistics (Population, production, consumption and trade)	
Other (specify)	

Semi-structured Key Informant Interview Checklist (Livestock)

(Identification of human resource gap through KII)

1. PRE-PRODUCTION PHASE

102. What are the emerging issues related to inputs for livestock development and your suggestions for human resources (HR) need to overcome the problems?

Emerging issues related to inputs	Suggestions for types of HR needed to overcome problems
1.	
2.	
3.	
4.	
5.	

2. PRODUCTION PHASE

201. What are the emerging issues related to livestock production and your suggestions for human resources (HR) need to overcome the problems?

Emerging issues related to production	Suggestions for types of HR needed to overcome problems
1.	
2.	
3.	
4.	
5.	

3. VALUE ADDITION/PROCESSING/AGRO-INDUSTRY DEVELOPMENT PHASE

301. What are the emerging issues related to value addition/processing in dairy / meat sector development and your suggestions for human resources (HR) need to overcome the problems?

Emerging issues related to value addition or processing or agro-industry development	Suggestions for types of HR needed to overcome problems
1.	
2.	
3.	
4.	
5.	

4. MARKETING/TRADE PHASE AND OTHERS

401. What are the emerging issues related to livestock market and marketing (in-country and international) and your suggestions for human resources (HR) need to overcome the problems?

Emerging issues related to outputs	Suggestions for types of HR needed to overcome problems
1.	
2.	
3.	
4.	
5.	

402. Your suggestions for human resources (HR) need at different levels of government

Level of government	Suggestions for types of human resources needed
1. Federal	
2. Provincial	
3. Local	

Semi-structured PRA Questionnaire (Food) for Federal Level Institutions (including functional food, feed)

(Identification of human resource gap at federal level)

1. POLICY MAKING, PLANNING, MONITORING AND EVALUATION

101. Adequacy of human resources (HR) for designing Food sector related policy, Food safety and quality, Feed, Food export/import and quarantine, Food processing, Food and Nutrition, National Reference Laboratory:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of HR needed?

Policy steps	Suggestions for types of HR need[1]
Problem analysis and policy formulation	
Policy advocacy	
Monitoring & supervision of policy implementation	
Evaluation of policies	

102. HR need for drafting/ formulating food and feed act, regulation, legal frameworks and planning

Adequate ☐ Inadequate ☐

Suggestions for types of HR needed

103. HR need for quality assurance and standard setting for inputs:

(HR need for regulatory, inspection, licensing, product standards, code of practices for agro-industries, risk analysis and bio-security services, GHP, HACCP)

Standard/QA	Required HR competencies need for input /output
Standard formulation	

[1] Types of HR need means competency of HR in terms of education, training and experiences.

Standard/QA	Required HR competencies need for input /output
Risk analysis and biosecurity	
Inspection and certification	
Code of practice/SOPs	
Good agricultural practice	

104. HR need for quality assurance and standard setting for infrastructures for commercialized farming:

Infrastructures	HR need for quality assurance and standard setting
Location	
Agriculture entrepreneur/ agro industries	
Quality of Water supply/irrigation	
Other facilities	

105. HR need for research:

Major & emerging sectors	HR need
Basic & strategic research (Food & nutrition and Food processing & preservation)	
Biotechnology, bioengineering/ new merging technology	
Agro-industries related	
Local, indigenous, traditional product.	
Others (specify)	

106. Adequacy of HR for coordinating and collaborating with development (foreign) partners for securing grant/aid/loan for Food sector development programs and projects:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

107. Adequacy of HR for harmonizing international laws or treaties or obligations or commitments (SPS/Codex/INFOSAN):

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

108. HR need for focal person/contact person and their duties (Codex, SPS, INFOSAN) as per the international commitments?

HR required …….

109. Adequacy of HR for HRD planning and implementation (federal/ provincial/ local level):

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

2. PRODUCTION PHASE

203. Adequacy of HR for coordinating and collaborating with provincial government for designing Food sector development plans and projects in line with national goal:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

202. Adequacy of HR for delivering efficient National Reference Laboratory service and their competency, effective epidemiology surveillance for food borne diseases and illness, coordinating with other laboratories, Inter Laboratory Comparison (ILC) in the country and Proficiency Testing (PT) for the reliability and competency of the laboratory?

Adequate ☐ Inadequate ☐

If inadequate, what are the required competencies of human resource?

Types of agency	Required competency of human resource
National Reference Laboratory	
Commodity Laboratory	
Food Quarantine Lab	
Risk analysis and epidemiological study	
Food Composition Lab	

3. VALUE ADDITION/PROCESSING PHASE

301. Adequacy of HR for planning, extension, training for post changing of an agricultural product into new through preservation, processing, cooking, drying, milling, packaging through agro entrepreneur:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

302. HR need for quality assurance and standard setting:

HR need for effective regulatory system: inspection, licensing, product standards, code of practices for agro-industries (food, functional food and feed) in the country:

Types of function	Adequacy	Inadequacy	Required competency of human resource
Market inspection			
Industry inspection			
Hotel and restaurant inspection			
Industry Licensing			
Standard formulation (Food and feed)			
Code of practices (Farm/fork)			

Types of function	Adequacy	Inadequacy	Required competency of human resource
Field inspection and spot checking (quick test) of food			
Others			

303. Adequacy of HR for planning and monitoring of code of practice, GMP, GHP and HACCP in agro industries and food premises

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

4. MARKETING/TRADE PHASE

401. Adequacy of HR for setting and monitoring of standard operating procedure (SOP), code of practice standards for packaging, transportation, weights and measures, and storage:

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

402. Adequacy of HR for collection, compilation and documentation, dissemination & maintaining statistics (sample collected and analysis, industries' inventories, food consumption patterns and trade etc):

Adequate ☐ Inadequate ☐

If inadequate, what are the types of human resources required for this purpose:

403. Additional Suggestions:

Semi-structured Questionnaire for Local Level Institutions (Food, Functional foods, Feed)

(Identification of human resource gap at local level)

1. PRE-PRODUCTION PHASE

101. HR need for coordinating with line and other agencies for food production inputs (raw material, machineries, equipment, chemicals additives/ detergent/ laboratory reagent, credit, insurance etc.) for agro industry:

What are the types of human resources required for this purpose?

102. Appropriate and adequate space, land for establishment, strengthen and improvement of food entrepreneur and industries in term infrastructure and resources?

What are the types of human resources required for this purpose?

103. HR need for coordinating research, extension, training and education institutions at local level:

What are the types of human resources required for this purpose?

104. Human resource (HR) need for formulating and implementing good practices of raw materials and other resources for food industry:

What are the types of human resources required for this purpose?

105. HR need for coordinating with diverse agencies such as land revenue, input & output traders, cooperatives, agro-vets, road, electricity, financial institutions, insurance companies, transporters, storage, cold chains etc. to support and enhance agro food processing production:

What are the types of human resources required for this purpose?

2. PRODUCTION PHASE

201. HR needs to disseminate technology for post-production/ pre-processing, storage, transportation and packaging of food commodities:

What are the types of human resources required for this purpose?

202. HR need for disseminating technology for food preservation, processing and preparation:

Major activities	Types of HR required
Food processing/ traditional food processing	
Food nutrition and recipes	

203. HR needs for delivering efficient laboratory service and their competency:

Types of agency	Required competency of human resource
Commodity Laboratory (food and feed analytical service)	
Nutritional composition analysis laboratory	
Epidemiological surveillance for food borne disease and illness	

204. HR need for delivering Risk management, epidemiological surveillance of food borne illness in local level:

Required competency of human resource

205. HR need for effective implementation of regulatory system (food, functional food and feed) in the local level:

Types of function	Required competency of human resource
Market inspection	
Hotel and restaurant inspection	
Industry inspection	
Industry Licensing	
Street food/catering/ canteen inspection	
Monitoring of good practices (pre- production, vegetable market, meat slaughtering house	
On spot testing/ checking of food	

206. HR need for coordinating and collaborating with funding agencies (e.g. provincial government, local government, NGOs, INGOs, private sectors etc.) for programs and projects?

Required competency of human resource

3. VALUE ADDITION/PROCESSING PHASE

301. HR need to conduct study, trail and product development for commercialization of products:

Activities	Required competency of human resource
Food preservation	

Activities	Required competency of human resource
Commercialization of traditional foods and their improvisation	
Formulation of new products	
Recipe development	
Branding and packaging	

302. HR need for education and training on food safety, food preparation etc at local level:

Activities	Required competency of human resource
Food hygiene and safety	
Food processing, preservation	
Nutritional food preparation	
Food inspection (Market/ industry/ catering)	
Food analysis	

303 HR needs for coordinating with line and other agencies such as land revenue, road, electricity, input suppliers/traders, cooperatives, agro-vets, financial institutions, marketers, transporters, storage, to maintain cold chain of perishable products

Types of human resources required:

4. TRADING/MARKETING PHASE

401. HR need for designing and implementing training for marketing service providers (collectors, handlers, packagers, transporters, storage, cold chains service provider, wholesalers, retailers etc.):

Required competency of human resource

402. HR need for designing guidelines for packaging, transportation, storage etc.:

Required competency of human resource

403. HR need for mobile food business, local vendors, their inspection, management and quality control:

Required competency of human resource

404. HR need for collecting, recording, maintaining, dissemination of data and statistic (food industries and outlets, market, food consumption, food borne cases and trade)

Required competency of human resource

Semi-structured PRA Questionnaire (Food) for Province Level Institutions (including functional foods and feed)

(Identification of human resource gap at province level)

1. Provincial Agriculture Policy making, Planning Monitoring and Evaluation

101. HR need for provincial level food sector plans/programs/projects and budget:

HR need for	Types of human resources required
Preparation of province level food control and safety policy and plan (including feed)	
Preparation of province level food and nutrition and food processing policy and plan	
Securing resources from federal and local governments and other sources	
Coordinating with federal, other province & local governments (including other sectors)for utilization plans, programs & projects	
Coordination, monitoring, supervision and evaluation of province level food sector development plan and budget	
Planning & budgeting for agro-industries & agro entrepreneurs	
Coordinating research, extension & education institutions for latest emerging technology **1. Food processing** **2. Food and nutrition** **3. Food quality and safety** **4. Biotechnology**	
Implementing joint programs/projects with federal and other province	
Designing, implementing, monitoring of survey & surveillance & risk analysis plans, programs & projects	
Designing, implementing & monitoring of regulatory functions (Market inspection, industry inspection, hotel and restaurant inspection, industry licensing and on spot checking and testing of food etc.)	
Designing, implementing and monitoring of code of practice, GMP, GHP and HACCP	

HR need for	Types of human resources required
in agro entrepreneurs and industries.	
Designing, budgeting, monitoring efficient laboratory service and their competency	

102.HR need for provincial level food sector for Laboratory testing

HR need for delivering efficient laboratory service and their competency, effective epidemiological center for food borne disease control, coordinating with other laboratories, inter laboratory comparison (ILC) in province and Proficiency testing (PT)for the reliability and competency of the laboratory:

Types of agency	Required competency of human resource
Provincial laboratory	
Commodity Laboratory (food and feed analytical services)	
Food composition and nutrient analysis lab	

103 Any other (specify): …….....

Semi-structured Key Informant Interview Checklist (Food)

(Identification of human resource gap through KII)

1. PRE-PRODUCTION PHASE

101. What are the emerging issues related to inputs for agro industry? In your opinion, what type of and your suggestions for human resources (HR) need to overcome the problems:

Emerging issues	**Suggestions for types of HR needed to overcome problems**
1. Raw materials, packaging materials	
2. Machineries / equipments	
3. Chemicals(additives /preservatives others)	
4. Others	

2. PRODUCTION PHASE

201. What are the emerging issues related to agro industrial production? In your view what type of human resources (HR) need to overcome the problems?

Emerging issues related to production	**Suggestions for types of HR needed to overcome problems**

3. VALUE ADDITION/PROCESSING/AGRO-INDUSTRY DEVELOPMENT PHASE

301. What are the emerging issues related to value addition, processing and product diversification? In your opinion, what types of human resources (HR) are needed to overcome these problems?

Emerging issues related to value addition, processing and product diversification	Suggestions for types of HR needed to overcome problems

4. MARKETING/TRADE PHASE AND OTHERS

401. What are the emerging issues related to trade (both domestic and international) of agricultural products and in your suggestions what type of human resources (HR) need to overcome the problems?

Emerging issues	Suggestions for types of HR needed to overcome problems

5. HR NEED AT DIFFERENT LEVELS OF GOVERNMENT

501. Your suggestions for human resources (HR) need at different levels of government for food safety, food laboratory, food processing, food and nutrition:

Level of government	Areas	Suggestions for types of human resources needed
Federal	Food Processing	
	Food Nutrition	
	Food Safety	
	Food export/import inspection and quarantine	
	Food Laboratory	
Provincial	Food Processing	
	Food Nutrition	
	Food Safety	
	Food export/import inspection and quarantine	
	Food Laboratory	
Local	Food Processing	
	Food Nutrition	
	Food export/import inspection and quarantine	
	Food Laboratory	

502. Any other suggestions:
