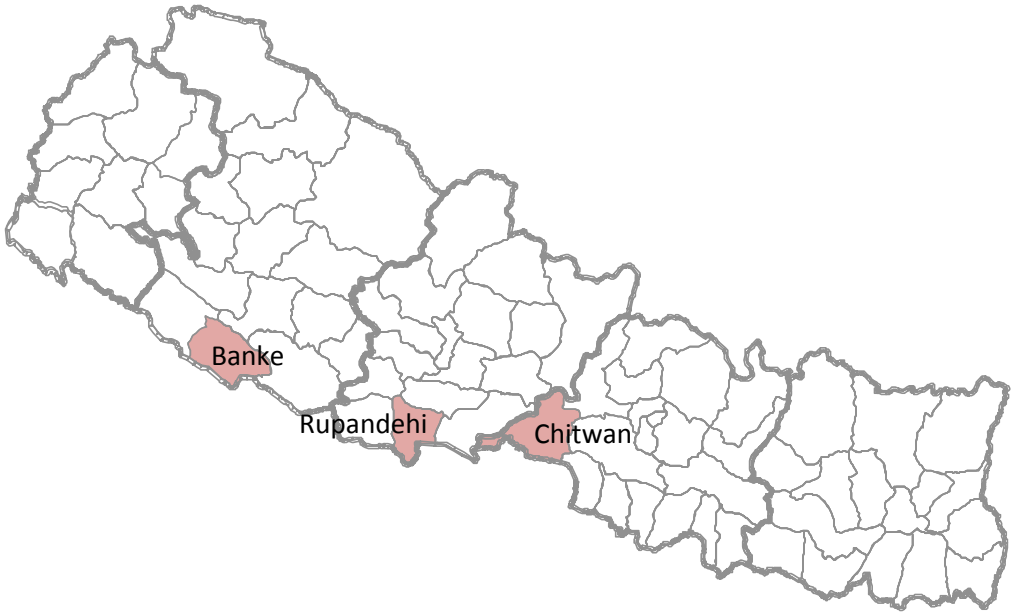
ANSAB
Rich Biodiversity and Prosperous Communities

Baseline Survey and Pre-KAP (Knowledge, Attitude and Practice) Study

in Chitwan, Rupandehi and Banke districts for One Health Asia Programme (OHAP) in Nepal



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Bhishma P. Subedi, Ph.D.

Executive Director

EXECUTIVE SUMMARY

Asia Network for Sustainable Agriculture and Bioresources (ANSAB) in partnership with Relief International (RI) and with financial assistance from European Union has been implementing One Health Asia Programme (OHAP) in Nepal for three years starting from March 2014. The project is premised on the One Health approach to improve health and wellbeing of the fragile population through the mitigation of risks and crises that originate at the interface between humans, animals, and their various environments. The project within three years will work on reducing zoonoses and alleviating their impact on fragile population in Chitwan, Rupandehi and Banke districts of Nepal by i) creating awareness for the behaviour change; ii) developing prevention and response capacity of communities, government agencies and academia; and iii) integrating surveillance of zoonoses within the government existing system and regulation.

The baseline survey and Pre-KAP (Knowledge, Attitude and Practice) study was commissioned by ANSAB in the project districts to document the baseline information which will be used as benchmarks against changes and progress of achievements. Along with the detailed assessment of the institutions for curative and diagnostic services for the zoonotic diseases in the country in general and the three project districts in specific, the study has analysed the KAP status on livestock health and husbandry, zoonoses and their impact on public health in the three districts. The findings from this study can later be evaluated using verifiable indicators presented in the logical framework during the project implementation.

Information presented in this report is pulled from secondary sources, focus group discussion and KAP/baseline survey conducted within the project districts from December 7, 2014 to January 7, 2015. The KAP survey involved 210 samples from the three districts with 70 samples from each district including 7 respondents from each of the project support committee (PSC).

Major zoonotic diseases in Nepal

In Nepal, situation of the zoonotic diseases has not been fully explored through the effective national surveillance system, and information available through researchers does not give full picture of prevalence and their hazardous impact. The Zoonoses Control Project (ZCP) of the Government of Nepal has listed Avian Influenza, Brucellosis, Leptospirosis, Hydatidosis, Cysticercosis & Toxoplasmosis as the six prioritised zoonoses in Nepal. Similarly, the Department of Livestock Services (DLS) has been reporting 11 such diseases to the World Organization for Animal Health (OIE) from the information received form districts through passive surveillance as mentioned in the following table.

Table: List of Zoonotic Diseases Reported from Nepal to OIE

SN	Diseases	2013	2012	2011	2010	Prevalence %	First report
1	Echinococosis/ Hydatids	1	0	3	1		1971
2	Leptospirosis	2	1	4	2	3.15	1987

3	Rabies	3	2	2	0		1960
4	Bovine cysticercosis	4	3	0	0	3.3	1982
5	Bovine tuberculosis	0	0	0	3		1985
6	Porcine cysticercosis	5	0	5	4		1982
7	Toxoplasmosis	6	0	0	0	25.97	1986
8	Brucellosis	7	4	6	6	2.97	1972
9	Botulinism	0	0	0	5		1986
10	Salmonellosis	8	5	0	0		1986
11	Japanese encephalitis	9	6	1	7		1978
12	Avian influenza	19	12	1	7	230	2006
13	Swine influenza						2008
14	Anthrax						

Source: World Organization for Animal Health (OIE), 2014

Curative and Diagnostic Services in Nepal

Medical services. The curative service in Nepal has been practiced in Nepal since the country enacted the planned health system in 1957. Since then, the country has formulated National Health Policy and two long-term health plans in order to increase the efficiency and effectiveness of the health care system and improve the management and organization of the public health sector in the country. The country has established curative system through different grade of hospitals based on the population ratio per unit and their requirement. These is provision of distribution of different health service centres to give equal coverage in all administrative units as in the following table.

Table: Structure of health services in Nepal and population ratio per unit

Health services	No.	Population ratio per unit	Remarks
Sub Health Post	3,199	1: 4,000	One in each VDC
Health Post	611	1:29,000	One in 5 VDCs
Primary Health Centre	205	1: 100,000	One in each election constituency
District Hospital	75	1:100,000	One in each district
Zonal Hospital	14	1: 1,300,000	One in each zone
Regional Hospital	5	1:3,600,000	One in each region
Central Hospital	9		Specialist service and education

Source: Ministry of Health and Population, 2015

The basic primary health service provided from the sub-health posts covers general curative, promotive and preventive health services through immunization, family planning, maternity and child health, health education, sanitation, and treatment of malaria, leprosy and tuberculosis. Introduction of different grade of hospitals has supported improvement in curative treatment.

Over the past decade, public health services have also been extended through the establishment of hospitals, colleges, health clinics, diagnostic centres and nursing homes from the private

sector. These health services however have been mainly concentrated in urban areas, and their diagnostic service is limited to human diseases. The National Public Health Laboratory serves as the reference lab with provision of specialized tests for non-communicable diseases and public health related tests for communicable diseases. The laboratory is linked directly with 291 Government Health Laboratories (8 Central Hospitals based, 3 Regional, 2 Sub-regional, 12 Zonal, 68 districts, 198 Primary Health Centres (PHC)) and indirectly with more than 1,237 private sector laboratories. While these laboratories provide diagnosis of human health in the country, there is no separate laboratory for the diagnosis of zoonotic diseases at district, zonal and regional hospitals along with those established by private sector.

Veterinary services. Veterinary service in Nepal began in Nepal with homeopathic system in 1939, mainly for the treatment of livestock raised in the palaces by the Rana ruling communities. With the outbreak of the Rinderpest disease in Kathmandu Valley in 1939, the need of veterinary service for the people to save their livestock was realized, leading to the adoption of allopathic treatment system. By the late 1950s, there were 33 hospitals, 21 dispensaries and 18 quarantine check-posts dealing with veterinary system in Nepal, and the veterinary services have expanded thereafter. Since 1980s, the Department of Livestock Services has been serving all the 75 districts with the introduction of new institutions, such as veterinary epidemiology centre, veterinary standards and drug administration office, veterinary public health, and quarantine services over the period. Different government projects, such as Strengthening Veterinary Services and Livestock Disease Control (SVSLDC) and Third Livestock Development Project (TLDP) have made significant efforts to establish private veterinary service in Nepal. However, the private veterinary service is still in a marginal scale in most part of Nepal besides some parts such as Chitwan, Kathmandu and Bhaktapur, where significant number of chicken and other animals are reared for meat production.

At present, the public sector (DLSO) has remained as the main source for veterinary service to the livestock sector. There are problem of under staffing and budgetary constraint in the public sector resulting to the weakening of the veterinary service in Nepal. The following table exhibits the animal population and the type of veterinary manpower in Nepal.

Table: Livestock population per type of veterinary manpower

Livestock	Livestock population	Livestock population per Vet (85 Vets)	Livestock population per Livestock Officers (75 Livestock Officers)	Livestock population per technician (1,608 Technicians)
Cattle	7,274,022	85,577	96,987	4,524
Buffaloes	5,241,873	61,669	69,892	3,260
Sheep	809,536	9,524	10,794	503
Goats	9,786,354	115,134	130,485	6,086
Pigs	1,160,035	13,647	15,467	721
Poultry	47,959,239	564,226	63,9457	29,825
Duck	375,975	4,423	5,013	234
Holdings	3,831,093	45,072	51,081	2,383

Source: 1) Animal Population, Statistical Information on Nepalese Agriculture, 2013, MOAC; 2) Staff positions, DLS (included only district positions); 3) Holdings from NSCAN, 2011/2012, CBS

The Government of Nepal has been operating veterinary laboratories at different level for the diagnosis of animal diseases in the country. The Central Veterinary Laboratory serves as the national referral laboratory and provides diagnosis of animal disease. Its diagnostic activities are extended in the country through the five Regional Veterinary Laboratories. Other national level laboratories including National Avian Laboratory, National Foot and Mouth Disease Laboratory, Trans boundary Animal Disease Laboratory provide disease specific diagnostic services. The 15 basic laboratories and 60 primary laboratories in 75 districts provide basic laboratory functions such as parasitological examination at the district level.

Zoonotic Disease Surveillance in Nepal

In the recent Health Policy, 2015 need of effective collaboration with all stakeholders to establish functional participation in managing and controlling zoonotic diseases have been realized. Epidemiology and Disease Control Division (EDCD) is responsible for planning, implementation, monitoring and evaluation of surveillance, prevention and control activities of diseases, and mobilizes Rapid Response Team (RRT) for the outbreak control. Within EDCD, Zoonotic Disease Sub-section has the mandate for prevention and control of the zoonotic diseases. On the veterinary side, with very limited manpower and financial resource, Veterinary Public Health Office within Directorate of Animal Health (AHD) has the mandate for the development of action plan for the identification, prevention, control and eradication of zoonotic diseases. There is need of a policy and financial commitment from Government of Nepal for launching an effective surveillance plan for zoonoses from the joint efforts of these two organizations.

Baseline Assessment in the Project Districts

Animal rearing practice. The present rearing practice of animals in the project districts by any standards portrays favourable environment for the spread of zoonotic diseases. The current practice of raising animal species within house of human or premises of human dwellings bring all the hosts together to complete pathogen cycle by producing the environment for quick transmission for zoonotic diseases. Even in stall-feeding system, animals are housed close to human dwelling for various reasons like prevention from predation and theft, and scarcity of land for raising animals.

Animal products (milk) and zoonoses. Because of the knowledge gap on major zoonotic diseases in the project districts where the people are involved in rearing animal for milk and meat purposes, the undesired consequences from zoonotic diseases is not observed in the project districts. The milk production and selling of animals for meat is the major reason for raising animals.

There are limited knowledge on milk born disease and good hygienic practice in milk production that is closely linked to the important zoonotic diseases like Brucellosis, Tuberculosis and Mastitis. There are over 100 dairy cooperatives in each project districts showing prospective business of milk, however, the KAP score on milk born disease show that there is gap on

existing knowledge resulting to poor attitude and practice. It is also observed that farmers and dairy use milk from sick cows and cows with mastitis. Regarding parasitism in animals, as the farmers lack enough knowledge on the parasitic diseases as well, the undesired consequences from parasitic diseases in not fully understood.

Butchers shops and slaughter practices. Meat business in the districts has become a growing enterprise, with increasing number of shops owned mainly by individual butchers. According to DLSO, Rupandehi, the range of annual turnover of about 175 butcher shops in the districts is from NRs. 3.6 million to 71.3 million, which reveals the big transaction in the business. It is also reported that Chitwan district has more than such 600 shops.

It is observed that the butchers started it without acquiring adequate knowledge of zoonoses and meat hygiene. It is observed that most of the responses from the butchers regarding to knowledge and attitude has not been applied in practice in the districts, affecting the production of wholesome meat by maintaining hygienic condition and meat quality. Spoilage of meat is very common as meat is exposed for long time in open place before refrigerating.

Butchers expressed willingness for change, but feel that they are not receiving guidance and proper knowledge. It is also observed, some meat shops, mostly the newly established ones are using with fly proof sale booths and refrigerators revealing their eagerness in changing behaviour and practice.

Some large companies, esp. in Chitwan district process meat for distant market of Kathmandu, Pokhara, and other big cities, and produce 30 to 100 MT of meat per month. Such large meat suppliers have their own moderately equipped slaughterhouses and cold chain facilities. However, meat inspection for ante-mortem and post –mortem at the slaughter place is not followed even in such large enterprises.

During meetings, the butchers and the people engaged in meat business expressed their enthusiasm for the change through effective training program together with DLSOs. Considering the major contribution of the individual butchers to the meat business, raising awareness and enforcing the code of practice required by the small-scale slaughter place and meat shops could be the best option to bring the behaviour changes in practice.

Medical, veterinary and diagnostic services. As in the national scenario, the health services in the project districts differ from each other. There is very good set up of medical institutions to render service for rural population from the public sector with improving situation in laboratory service for diagnosis of diseases, mainly human diseases. Once the policy dictates the importance to the zoonoses in human health, the sector has the capacity to manage the diseases.

Veterinary service in the districts is being managed with the limited manpower, and even this manpower spends more than 50% of working time on livestock extension activities required for the production. State run veterinary service is in line of free service as in medical, but has very scarce financial support. Livestock population is increasing, commercialization of production is encouraged to demand more effective veterinary service, but there does not exist any policy to add more manpower and livestock service centres despite the recommendation made in OIE's gap analysis.

Except in some disease control programme from vaccination, farmers are receiving veterinary service and drug supply through private clinics run by the government para veterinary profession. Though there is programme for passive surveillance, reliability is question marked in absence of laboratory evidences.

Regarding diagnostic services in the project district, there are no specialized manpower to work in the veterinary laboratories, manpower trained for clinical service have more preference to work in clinical service, and laboratories are short of good workers. Even having adequate infrastructural facilities, regional laboratories are not efficiently functioning.

On the other hand, all type of hospitals including primary health care centres have laboratories run by the laboratory technicians. With little support on biological and equipment and capacity building (training), these laboratories could be functional to meet the demand of diagnostic services for the zoonoses in the districts. Once the regional laboratories come to function, the situation could be further improved by adding training programme to district laboratory technicians and analysing referral samples from the districts.

Drug supply service. Drug shops are licensed to the pharmacist for medical drugs, while the village animal health workers (VAHWs) and others with proper training are licenced for veterinary drugs. The drug shops have been maintaining good supply of the drugs within the districts. Once the demand for the treatment of zoonoses is created, the private sector could adequately ensure the supply of drugs.

Cold chain system. In medical service, each District Public Health Office (DPHO) has developed its own system to ensure quality of biological and vaccines. It is observed that most of the livestock service centres in the districts, except in Chitwan districts don't have refrigerators even for maintaining cold chain system for short term. Private companies supplying drug and vaccines as are regulated by the Department of Drug Supply and are subjected to regular inspection to maintain their own reliable cold chain system.

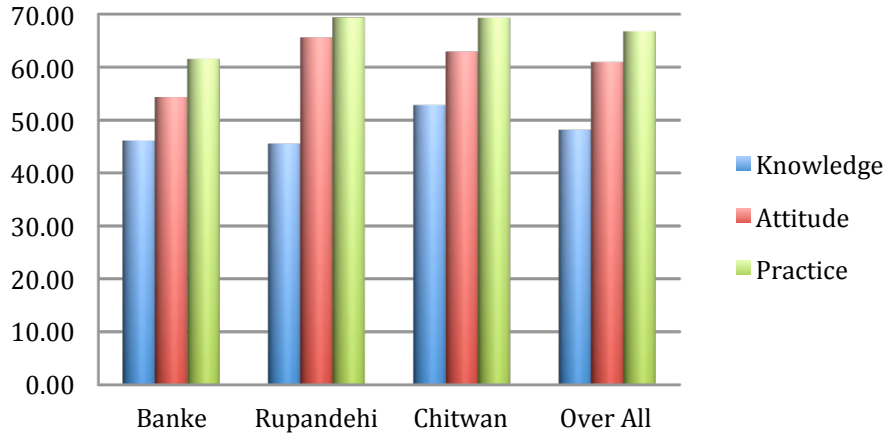
Research on zoonoses. At the district level, there are very limited research works done on medical and veterinary diseases. Regarding the presence of some medical and veterinary colleges in the districts, supporting the researchers including students in these institutions could be more viable to conduct research work while supporting the students while pursuing for the degree. Some of the institute in the project districts with public health and veterinary research mandate are Banke Medical College in Nepalgunj and Veterinary College in Rampur in Chitwan.

Awareness raising on zoonoses. As mentioned before, there is a need to raise public awareness on zoonoses in the project district. It is observed that the communication massage received from television, local FM radio, village health workers, village animal health workers are more effective to reach larger proportion of the population. Furthermore, regarding the high literacy rate of the two project districts Chitwan and Rupandehi have high literacy rate that the national average, and the annual enrolment of students is high (about 0.49 millions), there is a good opportunity to create awareness on zoonoses in larger communities through school system.

Knowledge, Attitude and Practice (KAP) on Zoonoses in the Project Districts

The following figure presents the district wise KAP score for Chitwan, Rupandehi and Banke. The scores for all three factors were high for Chitwan followed by Rupandehi and Banke districts. It is interesting to note that the scores for Attitude and Practice were higher than that of Knowledge in all the three districts. It could be because of the cultural practice in the districts, which have been adopted by the community members since long. The cultural practice adopted by the communities based on beliefs and cultural norms might have established the current attitude in the three regions.

Figure: KAP score by districts



Source: Field Survey, 2014

The poor score in knowledge indicates that there is a need of awareness on zoonoses in the project districts. Knowledge was found influencing factor to set attitude and practice. Chitwan looks better in knowledge in comparison with other districts in attitude. Banke differed from other two districts; and there is similarity in practice in the all three project districts. From the KAP result it appears that Banke district needs more intensive effort to improve zoonoses preventive measures. Zoonoses environment is similar in all three districts, and a set of communication materials developed could be applicable in all three districts.

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CHAPTER I: BACKGROUND AND SCOPE OF THE STUDY

1.1 General introduction

There are 7.27 million cattle, 5.24 million buffaloes, 0.80 million sheep, 9.78 million goats, 1.16 millions pigs, 47.95 million chicken and 0.37 million ducks in Nepal, producing 1,680,812 MT of milk, 295,167 MT meat, 887.24 million eggs and 0.58 MT wool on an annual basis (SINA, MOAC, 2012/2013), which contributes to about 33% of the national GDP (MOAC, 2013). The population census shows that about 90% of the households with agricultural land, and 2.94% landless households possess some kind of livestock and poultry (CBS 2002). The distribution of livestock species per household is 59.53% for cattle, 43.56% for buffaloes, 61.4% for goats, 47.21 for poultry, 11.61 for pig, 2.51 for sheep and 0.16 for Yak Chaunry (NASAN, CBS, 2011/12.). National surveys show that 95% of livestock population is raised by the marginal landholding households (NSCAN, CBS, 2011). Wide distribution of different animal species at household level along with high density for some livestock and poultry without good farm practice at production system has been contributing factor for reduction of livestock productivity. At the same time, the current practice has also been increasing vulnerability of a range of zoonotic diseases to the human population.

Despite the large animal population, shortage of livestock products is evident due to the loss of production from high incidence of infectious diseases, such as avian influenza, foot and mouth disease, pesti des petits ruminants and others with an annual loss of about US$ 230 million. Other epidemiological studies made on single disease record devastating production loss of US $37 million from liver fluke alone in buffaloes (Mahato, 1993) and a loss of US $7.3 million from Parasitic Gastro Enteritis in small ruminants (Joshi, 1995).

Besides the production loss, many of the animal diseases are zoonoses that are transmissible to a human. This not only reduces the income from production loss but also create unwanted results by lowering working capacity of human and loss of lives of the marginal farming communities. Further evidence shows that climate change and the El Niño Southern Oscillation (ENSO) phenomenon result in seasonal climate fluctuations with the rise of ambient temperatures and frequent natural disasters from flood and drought subsequently increasing the risk of outbreaks of infectious disease in animals.

So far, control measures of zoonotic diseases are being applied to only specifically important diseases to human (vector born) or animal (mostly in trans-boundary diseases, TAD). Outbreaks of highly pathogenic avian influenza in neighbouring countries esp., India, Bangladesh and China in 2006 had serious consequences to human health and poultry production. In response to the epidemic, Nepal implemented the Avian Influenza Control Project (AICP) between 2007 and 2011 with joint efforts from medical and veterinary services.

The AICP supported the Department of Livestock Services (DLS) and the Department of Health Services (DOHS) to develop prevention and control mechanisms by strengthening technical capacities in surveillance, diagnostics, bio-security, quarantine, response (containment

among animals and human case management), and communication. The project was successful in enhancing technical capacity, risk communication, sectoral co-ordination between Animal and Human health sector. This included involvement of District administration and police for a collaborator approach in creating an environment of "One Health Approach".

Following AICP, a new Zoonoses Control Project (ZCP) was launched for two years from 2012 to expand the scope of controlling zoonotic diseases in Nepal under a "One Health" approach. Main focus of the project remained on enhancing capacity of the country in planning, coordination, preparedness, and prevention of zoonotic diseases, specifically strengthening capacities of the Department of Livestock Services (DLS) under the Ministry of Agriculture Development (MoAD) and the Department of Health Services (DOHS) under the Ministry of Health and Population (MOHP). National Agriculture Research Council (NARC) under MoAD was entrusted for better understanding animal and human interface with the ecosystem and developing early warning system which initiates an effective response in reducing risk of livestock disease imposed by climate change. The project believed that with reduction of the disease incidence in animals it would enhance livestock productivity and strengthen the livelihoods of marginal communities facing food insecurity.

ZCP recognized six diseases - Avian Influenza, Brucellosis, Leptospirosis, Hydatidosis, Cysticercosis and Toxoplasmosis as priority zoonotic diseases in Nepal and have developed surveillance plan and control strategy for the control measures of these diseases. However, these plans have yet to be materialized in action. In line with ZCP, the current One Health Asia Program (OHAP) has been designed and launched in Chitwan, Rupandehi and Banke districts by Asia Network for Sustainable Agricultural and Bioresources (ANSAB) in partnership with Relief International (RI) and with funding from European Union (EU). This KAP (Knowledge, Attitude, and Practice) survey is commissioned as an explorative bench mark study to measure the success of the project after its completion.

1.2 Knowledge, Attitude and Practice (KAP)

Knowledge is a set of information, understandings and science that reflects one's capacity for imagining and perceiving. Knowledge of a health-behaviour is considered to be beneficial, however it does not automatically mean that this behaviour will be followed. While attitude is a way of being a position, these are leanings or "tendencies." This is an intermediate variable between the situation and the response to this situation. It helps explain that among the possible practices for a subject submitted to a stimulus, that subject adopts one practice and not another. Attitudes are not directly observable, thus it is a good idea to assess them. In contrast, practices or behaviours are the observable actions of an individual in response to a stimulus, which could be positives or negatives. In this perception, this KAP study has been conducted. It is interesting to note that numerous studies have often shown to have a low and sometimes no connection between attitude and practices.

1.3 OHAP project coverage area and objective

With the financial assistance from EU, ANSAB in partnership with RI is implementing One Health Asia Program in Chitwan, Rupandehi and Banke districts of Nepal from March 2014 for the reduction of zoonoses and alleviate their impact on fragile population by promoting awareness, behaviour change, and coordination between individuals, local and national authorities. The specific objectives of the program are to:

1) Create awareness and behaviour change
2) Develop prevention and response capacity of communities, government departments and academia
3) Integrate zoonoses surveillance within existing government regulations

Figure 1: OHAP coverage districts

1.4 Objectives of the study

The main objectives of the study are to:

1) Provide reliable baseline information, which will be used as benchmarks against which changes and progress of achievements can be measured and evaluated using verifiable indicators presented in the logical framework during project implementation.
2) Determine Knowledge, Attitude and Practices (KAP) status on livestock health and husbandry, Zoonoses and their impact on public health among the targeted beneficiaries.

The specific objectives of the study are to:

1) Document the existing qualitative and/or quantitative value of the project indicators based on the given logical framework
2) Create better understanding of existing knowledge, attitudes and practices among the project beneficiaries and to describe vulnerabilities and gaps.
3) Generate baseline data on existing knowledge, attitudes and practices in the target districts as part of a framework for monitoring progress.
4) Provide essential data for formulation of key messages and required areas of focus in awareness raising campaigns.

1.5 Scope of study

The baseline survey, primarily the KAP study, will establish baseline figures or status for various indicators as outlined, with the view that the same indicators will be re-assessed in final evaluation and the post-KAP to be conducted at the end of the project. The study has set its scope for the following set of activities in the project districts in order to collect the information for the KAP study.

- Assessment of the current condition of the physical infra-structure e.g. Veterinary Hospitals, Vet service centres, Veterinary colleges/training institutes, Medical colleges, Hospitals, medical institutes, and medical and veterinary laboratories or diagnostic facilities at least on sample basis, and their response in prevention of zoonoses
- Assessment of the cold chain maintenance of vaccines and biological, and the surveillance and reporting system of zoonoses from grassroots level to the central reporting system.
- Determination of the current availability and quality of key health services, drugs, vaccines and equipment used by the local practitioners (both veterinary and public health as per sample study)
- Identification of Butchers shops and slaughterhouses or slaughter practices as per scientific/hygienic standards as per sample study.
- Identification of the local media for campaign such as TV, satellite, newspaper, radio etc.
- Determination of the project stakeholders who have directly or indirectly related to the project

1.6 Limitation of study

- Information was obtained mainly from the project districts, and it does not depict over all national picture of Nepal.
- To draw broader and exploratory aspect baseline data, KAP could not be specific to particular zoonoses and area of vulnerability.

CHAPTER II: MEDICAL AND VETERINARY SERVICES IN NEPAL

2.1 Medical and veterinary service policy

2.1.1 Health policy

Planned health system began in Nepal since 1957 as the country introduced periodic plan for the development through National Planning Commission. Need of a Long-Term Health Plan to provide a realistic and workable guidance (vision/strategy) to improve the management and organization of the public health sector to increase the efficiency and effectiveness of the health care system was realized. This Long-Term Health Plan was necessary to provide guidance and support to private and NGO sectors, Donor Organizations to direct the resources and expertise where it is most needed.

In 1975, the first Long Term Health Plan for the period 1975 – 1990 was formulated with a calendar of operations fitting within the Fifth, Sixth and Seventh Five Year Plan. The main emphasis was the provision of comprehensive basic health services to the majority of the rural population.

The National Health Policy (1991) established a policy framework to guide health sector to upgrade the health standards of the majority of the rural population by strengthening the primary health care system, making effective health care services readily available at the local level. Leaving curative treatment to hospital system, basic Primary Health Services was established through Sub- Health Post to provide general curative, promotive and preventive health services through immunization, family planning, maternity and child health, health education, sanitation, and treatment of malaria, leprosy and tuberculosis.

One Sub-Health Posts with one village health worker, one maternal and child health worker and one auxiliary health worker were proposed for each VDC. One Health posts at each election constituencies were sanctioned which gradually aimed to promote to Primary Health Centre with provision of one doctor with two-bed hospital.

Private sector was encouraged to extend health services through the establishment of hospitals, colleges, health clinics, diagnostic centres, nursing homes, without any financial liability to the Government.

The National Health Policy elaborated specific policy objectives to address the following main areas:

a) Preventive and promotive health services;
b) Basic primary health services;
c) Curative health services;
d) Ayurvedic and other traditional health services;
e) Organization and management

f) Community participation in health services;
g) Human resources for health development;
h) Drug supply;
i) Resource mobilization in health services;
j) Health research;
k) Private, NGO health services and inter-sectoral coordination; and
l) Decentralization and regionalization.

Further, Second Long Term Health Plan for the period 1997-2017 has been developed in line with First Long Term Plan for strengthening health sector. Based on Second Long Term Plan, two Nepal Health Sector Strategy Implementation Plan (NHSP-IP) for the period 2004-2009 and Nepal Health Sector Strategy Implementation Plan (NHSP –IP III) for the period of 2010-2017 have been providing operational guidelines for implementing the outputs of the Health Sector Reform Strategy. As in the second NHSP -II focus was on Laboratory strengthening, five regional diagnostic laboratories have been approved and are on the process of establishment.

2.1.2 Curative service

These health policies have established curative system through different grade of hospitals based on the Population Ratio per Unit and their requirement. These is provision of distribution of different health service centres to give equal coverage in all administrative units as in the Table No. 1

Table 1: Structure of health services in Nepal and population ratio per unit

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Central Hospital	9		Specialist service and education

Source: Ministry of Health and Population, 2015; "A brief introduction and progress report of Ministry of Health and Population of Nepal"

District hospitals are first level referral hospitals that offer in-patient (15-25 beds) and outpatient care. At present there are 65 district hospitals; health centres located at the district headquarters serve the 10 districts without such facilities. Gradually, these 10 health centres will be upgraded to district hospitals. The zonal hospitals (50 to 150 beds) are the second level of referral hospitals to regional hospitals with 150 to 250 beds. Currently, there are 9 zonal and one regional hospital but there has been vigorous attempt to upgrade and add health institutions in the country.

Primary health centres provide the eight elements of primary health care, i.e. appropriate treatment of common diseases, provision of essential drugs, control of communicable diseases,

immunization, reproductive health, water and sanitation, and nutrition, health education. They are to be established in each of the 205 electoral constituencies. The PHC is led by a medical doctor with the additional support of other staff and is equipped with one maternity and two emergency beds.

The health posts consist of one health assistant, two auxiliary health workers, two auxiliary nurse midwives and one village health worker. Health posts provide curative, preventive and promotive services including treatment of common diseases and injuries.

Sub-health posts are the peripheral institution of the health care delivery system. They are established one in each Village Development Committees (VDCs). The SHP staffed by one auxiliary health worker, one village health worker and one maternal and child health worker. SHPs provide simple curative, promotive and preventive health services. Outreach programmes operate at the ward level thorough the use of Village Health Worker (VHW) and Female Community Health Volunteer (FCHV)

Recent Health Policy 2015 aims to establish a Primary Health Care Centre (PHC) in each VDC with laboratory and X- ray service, and posting of one midwife in each ward of the VDC. The policy also realises the need of effective collaboration with all stakeholders to establish functional participation in managing and controlling zoonotic diseases.

Health policy realizes the need of an epidemiological surveillance system, including effective control measures with laboratory back up for early detection, confirmation of diagnosis and antibiotic sensitivity rather than developing a new surveillance system only for identifying the diseases.

Currently, Epidemiology and Disease Control Division (EDCD)is responsible for planning, implementation, monitoring and evaluation of surveillance, prevention and control activities of diseases, and by mobilizing Rapid Response Team (RRT) for the outbreak control. Within EDCD, zoonotic disease sub-section has the mandate for prevention and control of the zoonotic diseases.

2.2 Veterinary service policy

Veterinary service in Nepal begins with homeopathic system in 1939, mainly for the treatment of livestock of Rana ruling communities raised in the palaces. From the devastating effect of Rinderpest disease in Kathmandu Valley in 1939, need of veterinary service for the people to save their livestock was realized and a policy shift from homeopathic to allopathic system was adopted.

Veterinary service of a nation in the World Organization for Animal Health (OIE)'s definition is, "the governmental and non-governmental organizations that implement animal health and welfare measures and other standards and recommendations of the Terrestrial and Aquatic Codes in the country."

With the introduction of allopathic treatment, a veterinary hospital was established in 1942 for public, and as it became popular, by 1958 there were 33 hospitals, 21 dispensaries and 18 quarantine check posts were in service. In the 6th five-year plan (1980-1985) present institutions of DLS were added to serve all the 75 districts of the country. Recently, some new institutions, quarantine services, veterinary epidemiology centre, veterinary standards and drug administration office, veterinary public health have been added to improve the services.

Since 1985, there have been many plans, policies and strategies in Agricultural sectors such as: Agricultural Prospective Plan, 1995 (APP), Livestock Master Plan 1995-2010, National Agriculture Policy, 2004; Agribusiness and Market Promotion Policy 2006, Dairy Development Policy, 2007, Agriculture Bio-diversity Policy, 2007, Trade Policy, 2009, Agricultural Development Strategy (ADS) 2013, but so far veterinary service is concerned, none of them are in line with OIE guidelines. Development of veterinary service is mainly taken in consideration of trans-boundary animal diseases for reduction of production loss from the diseases.

Currently, the public sector (DLSO) is the sole source for veterinary service to the livestock sector, which has been constrained by sufficient number of staffs and budget to respond requirement of veterinary service demanded by the large animal population of the country.

Although, the Veterinary Authority has been legally established under Animal Health and Livestock Services Act 1998, Nepal Veterinary Council Act 1999 and their regulations, there has been no regulatory mechanism to justify the quality of service offered from the private sector including other professionals and para-professionals within their responsibility and competence.

Private veterinary service in Nepal is still in a very marginal scale even though effort had been made for its establishment through the projects; Strengthening Veterinary Services and Livestock Disease Control (SVSLDC) and Third Livestock Development Project (TLDP).

As a member of World Trade Organization (WTO) and OIE, besides preventing animal diseases to support livestock production in the country, Nepal has an obligation to harmonize with OIE international standards to avoid the introduction of pathogens via international trade of animals and animal products, while at the same time preventing the country from setting up unjustified sanitary barriers. In compliance to OIE's guidelines, standards for quality of the Veterinary Services (VS) have been fixed to ensure guarantee and their reliability of the international certificates issued by the member countries.

These recommendations include to have an adequate legislative framework, organizational structure with clear chain of command and clear division of competencies, sufficient number of competent personnel for creating and implementing all aspects of veterinary activities (animal health, animal welfare and veterinary public health), appropriate technical resources and stable and adequate funding. On the basis of these requirements OIE has evaluated the Performance of Veterinary Services of Nepal (PVS Evaluation, 2008, OIE) and their improvements (PVS Gap Analysis, 2011, OIE) have been completed, and have outlined the areas of improvement with

detailed programmes. However, the government of Nepal has neither made any commitment nor has been addressed by the policy.

In present context, inadequate trained manpower, and budget are reducing the efficiency in the organization. Table No 2 gives the ratio of between veterinary professionals and animal population.

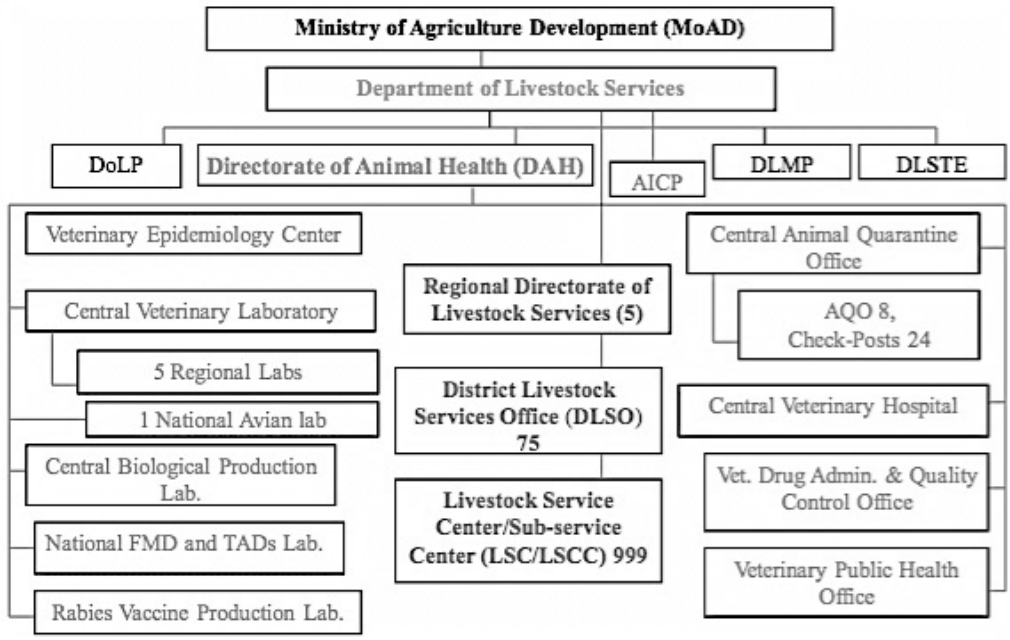
Ratio of technicians to animal population is very high to give full coverage of veterinary service from the public sector and there has been no strategy to introduce private sector for clinical service as has been done in most of the other countries.

Table 2: Livestock population per type of veterinary manpower in Nepal

Livestock	Livestock population	Livestock population per vet (85 Vets)	Livestock population per livestock officers (75 Livestock Officers)	Livestock population per technician (1,608 Technicians)
Cattle	7,274,022	85,577	96,987	4,524
Buffaloes	5,241,873	61,669	69,892	3,260
Sheep	8,09,536	9,524	10,794	503
Goats	9,786,354	1,15,134	1,30,485	6,086
Pigs	1,160,035	13,647	15,467	721
Poultry	47,959,239	5,64,226	6,39,457	29,825
Duck	3,75,975	4,423	5,013	234
Holdings	3,831,093	45,072	51,081	2,383

Source: 1) Animal Population, Statistical Information on Nepalese Agriculture, 2013, MOAC; 2) Staff positions, DLS (included only district positions); 3) Holdings from NSCAN, 2011/2012, CBS

Figure 2: Current organogram of veterinary services in Nepal



Source: Department of Livestock Services, Government of Nepal, 2014

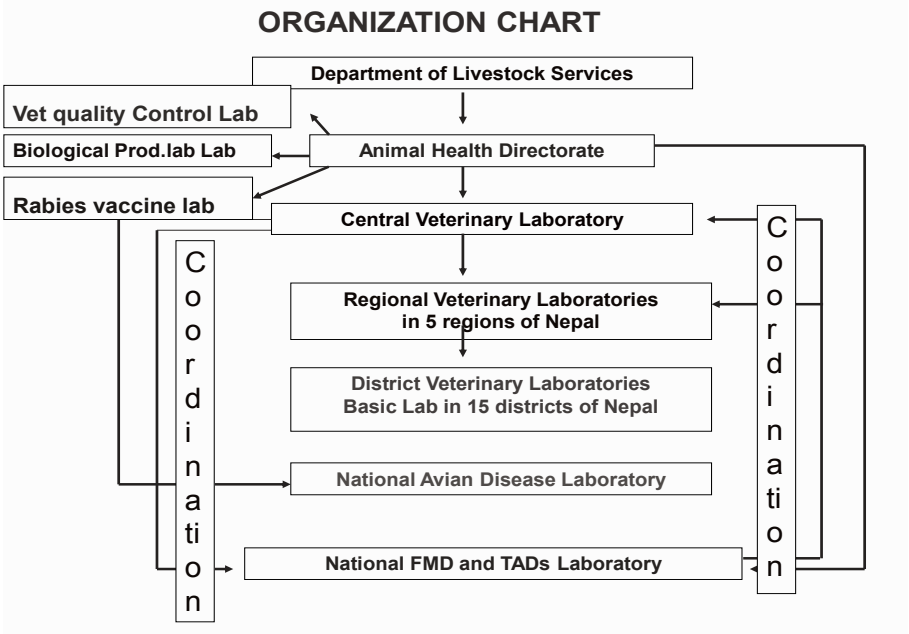
2.3 Laboratory system and diagnostic capabilities

Laboratory service is the most essential component in disease diagnosis, monitoring and surveillance both to medical and veterinary services. In medical service, laboratory service was established in 1965 at Bir Hospital, which was later converted to the Public Health Laboratory in 1978 and to the current National Public Health Laboratory since 1991 as an independent national unit. The Central Veterinary Laboratory was established in 1995 under the Department of Livestock Services for the diagnosis of animal diseases based on scientific evidence.

2.3.1 Veterinary laboratories

The Central Veterinary Laboratory (CVL) has been established for the diagnosis of animal diseases and has been acting as National Referral Laboratory under the Directorate Animal Health. These CVL diagnostic activities are extended in the country for the diagnosis of animal diseases throughout the country through five Regional Veterinary Laboratories (RVLs) located one in each of the development regions; eastern (Biratnagar), central (Janakpur), western (Pokhara), mid-western (Surkhet), and far-western (Dhangadhi). National Avian Laboratory is located at Bharatpur, Chitwan. 15 basic laboratories are established in Ilam, Jhapa, Saptari, Sarlahi, Rautahat, Parsa, Makawanpur, Kavrepalanchowk, Chitwan, Rupandehi, Dang, Banke, Jumla, Dadeldhura and Kanchanpur. These are districts that are capable to perform parasitological examination, microbial culture and antibiotic sensitivity test. Specimens that could not be processed in laboratories are referred to regional laboratories and CVL. Other 60 districts have primary laboratories for faecal and other basic test to support the diagnosis within the district.

Figure 3: Existing veterinary laboratory system under the Department of Livestock Service



Source: Central Veterinary Laboratory, Government of Nepal

Other centrally established laboratories in function are; National Avian Disease Investigation Laboratory at Chitwan, National Foot and Mouth Disease Laboratory, Budhanilkantha and Trans boundary Animal Disease Laboratory at Kathmandu. Further, Veterinary Quality Control Laboratory at Kathmandu to maintain veterinary standard for drugs and vaccines in use in the country and Central Biological Production Laboratory for the production of vaccines and biological, are in function. There is also a separate laboratory producing tissue culture of rabies vaccine for animals, which in collaboration of the National Public Health Laboratory is attempting to produce rabies vaccine for human use.

As far the capacity is concerned, CVL is BSL II and is equipped for Parasitological, Bacterial, Histopathology and other Biological tests. Enzyme-linked immune-absorbent assay (ELISA) test, conventional PCR real time PCR (ABI 7500) has been on use for the diagnosis of diseases. All other regional laboratories are equipped with ELISA test facility and such facilities are not extended in district level laboratories.

CVL has been conducting faecal examination for Taeniasis and Ova and cyst Identification for Toxoplasmosis in cat and Echynococcus in dog. For bacterial diseases, isolation of bacteria such as *E. coli, Staphylococcus spp., Streptococcus spp., Klebsiella spp., Salmonella spp.*of zoonotic importance has been conducted. Plate Agglutination Test (PAT) test is being used for *Brucella abortus* in cattle, buffalo and goats and PAT test for *Salmonella pullorum* in poultry.

For the serological tests, ELISA, tube agglutination, agar gel immune diffusion (AGID), PAT etc. are being used. Molecular identification for sub typing to H5 and H9 are also conducted.

Figure 4: Existing laboratory network in Nepal

Source: Central Veterinary Laboratory, Government of Nepal

2.4 *Laboratory capacity in human health*

A well-established National Public Health Laboratory (NPHL) is in operation as the reference lab with provision of specialized tests for non-communicable diseases and public health related tests for communicable diseases. It is linked directly with 291 Government health laboratories (8 central hospitals based, 3 regional, 2 sub-regional, 12 zonal, 68 districts, 198 PHCs) and indirectly with more than 1,237 private sector laboratories. All regional, zonal and district hospitals have their own laboratory but with limited diagnostic capacity.

There is no separate laboratory for the diagnosis of zoonotic diseases, which is currently served by the existing laboratories. Recently, to strengthen the laboratory service, the Government of Nepal has approved the establishment of five regional laboratories in Biratnagar, Janakpur, Pokhara, Nepalgunj and Dhangadhi.

There is one BSL 1 (biosafety level 1) laboratory for routine virology work and one BSL 2 recently upgraded to BSL 3 for specific diseases like HIV and Influenza virus. NPHL have not launched specific program for the surveillance on zoonoses and the other diseases of burden, but it has been conducting laboratory-based surveillance for AES/JE and Measles/rubella. However, routine tests are conducted for outbreak investigation of Dengue, Leptospirosis, Brucellosis, Chickungynya, Cysticercosis and Echynococcus.

Table 3: Current capacity of National Public Health Laboratory (NPHL)

Disease	RDT	Serology (ELISA)	Molecular (PCR/RT-PCR)	Isolation
Influenza (A/B)	Yes	Yes	Yes	Yes
Leptospirosis	Yes	Yes	Yes	No
Brucellosis	Yes	Yes	In process	After BSL 3 lab comes into operation
Dengue	Yes	Yes	In progress	No
JE	No	Yes	No	No
Measles	No	Yes	In progress	No
Rubella	No	Yes	No	No
Campylobacter	No	No	No	Yes
Anthrax	No	No	No	No
Plague	No	No	No	No
Nipha Virus	No	[After BSL 3 lab comes into operation]		
SARS	No	No	No	No
Unusual Hemorrhagic Fever	No	No	No	No
Avian influenza (Human case)	No	No	In progress (after BSL 3 lab is functional)	

Source: Nepal Public Health Laboratory, Government of Nepal

Research activities are limited and surveillance on AES/JE, Influenza and AMR and in some selected bacterial pathogens have been conducted. However, some pilot studies have been carried in selected districts on Leptospira and Brucella through Massey University.

In conclusion, considering the medical and veterinary laboratory facilities in Nepal, the medical Laboratories appear to be working effectively as they build up their human resources from multi-disciplinary professionals such as pathologists, microbiologists, virologists, medical lab technologists, laboratory technicians and bio-medical engineers. The veterinary laboratories, on the other hand are run from only veterinarians and veterinary paraprofessionals.

Currently, the medical diagnostic laboratories have been working at community level through Primary Health Centres to support the clinicians or health facility. The Health Policy 2071 further envisages extending laboratory and X -ray services to the VDC level. The table presented below gives the magnitude of laboratory service offered at Rupandehi district. DPHOs are found regularly organizing in service training programme to the district laboratory technicians, and such trainings are focused to conduct tests for zoonotic diseases, that could meet the laboratory support required for the investigation and surveillance of zoonotic diseases.

Table 4: Field samples tested in Rupandehi district

Tests/ FY	2068/ 69	2069/ 70	2070/ 71
Parasitology/ Bacteriology	2,02,711	95,964	1,71,628
Virology	92,494	6,956	4,408
Haematology	62,542	3,70,260	3,05,844
Microbiology	39,054	27,032	15,407
Histopathology	14,337	1,877	16,140
Biochemistry	8,900	2,39,912	1,51,886
Immunology/ Serology		86,994	64,499
Other Tests	2,02,711	25,277	1,858

Source: District Public Health Office, Rupandehi

In veterinary laboratories, as there is single discipline engaged in laboratory work, very often laboratory qualified persons are not being posted in the laboratories. Despite having enough equipment including ELISA in the regional laboratories, they have not been conducting the tests effectively with the limitation of manpower.

2.5 Incidence of zoonotic diseases

Any disease or infection that is naturally transmissible from vertebrate animals to humans and vice-versa is classified as a zoonotic disease. Out of 1,415 identified species of infection, 61% of them are classified as zoonotic and about 75% of the new diseases that have affected humans over the past 10 years have been caused by pathogens originating from animals or products of animal origin. Among the zoonotic species, 175 pathogenic species are considered to be associated with Emerging Infectious Diseases (EIDs). Such diseases are important in the context

of Nepal as most of the domestic animals are reared closely to the human dwellings as a part of family.

In Nepal, situation of the zoonotic diseases has not been fully explored through the effective national surveillance system, and information available through researchers does not give full picture of prevalence and their hazardous impact. The DLS has been reporting 11 such diseases to the World Organization for Animal Health (OIE) from the information received form districts through passive surveillance as mentioned in the **Error! Reference source not found.**.

Table 5: List of zoonotic diseases reported from Nepal to OIE

SN	Diseases	2013	2012	2011	2010	Prevalence%	First report
1	Echinococosis/ Hydatids	1	0	3	1		1971
2	Leptospirosis	2	1	4	2	3.15	1987
3	Rabies	3	2	2	0		1960
4	Bovine cysticercosis	4	3	0	0	3.3	1982
5	Bovine tuberculosis	0	0	0	3		1985
6	Porcine cysticercosis	5	0	5	4		1982
7	Toxoplasmosis	6	0	0	0	25.97	1986
8	Brucellosis	7	4	6	6	2.97	1972
9	Botulinism	0	0	0	5		1986
10	Salmonellosis	8	5	0	0		1986
11	Japanese encephalitis	9	6	1	7		1978
12	Avian influenza	19	12	1	7	230	2006
13	Swine influenza						2008
14	Anthrax						

Source: World Organization for Animal Health (OIE), 2014

Importance of zoonotic diseases varies from country to country. However, the World Health Organization of the United Nations (WHO) has shown concern on some diseases such as Anthrax, Animal influenza, Bovine Spongiform Encephalopathy (BSE), Food-borne zoonoses, Hemorrhagic fevers, Leptospirosis, Neglected zoonotic diseases, Prion diseases, Tularaemia and Variant Creutzfeldt-Jakob disease (vCJD)

Among the diseases enlisted as neglected diseases by WHO, all diseases - Anthrax, Bovine Tuberculosis, Brucellosis, Cysticercosis and Neurocysticercosis, Cystic Echinococosis/ Hydatids disease and Rabies are prevalent in Nepal.

Vector borne diseases like Malaria, Kala-azar, Lymphatic, Dengue, Filariasis, Japanese Encephalitis, and other diseases of importance such as Rabies, *HIV/AIDS* and Tuberculosis have been under control management by the Department of Health Services. Five priority diseases identified by the Department of Health Services are Leptospirosis, Salmonellosis, Brucellosis, Dengue and Influenza.

According to the Zoonoses Control Project (ZCP), six priorities zoonoses in Nepal are Avian Influenza, Brucellosis, Leptospirosis, Hydatidosis, Cysticercosis and Toxoplasmosis.

2.6 Disease surveillance

The surveillance of zoonotic diseases are mainly conducted to i) monitor the epidemiology of zoonotic diseases in terms of time, person and place, ii) detect outbreaks of zoonotic disease to identify a source for implementation of appropriate public health interventions and prevent further transmission from setting an effective work plan, and iii) communicate the patterns, risks and trends about zoonotic diseases to the public, government and other key stakeholders.

Government and private laboratories have been adequately supporting to the diagnostic need of zoonotic diseases of hospitals and clinics. However, there are no surveillance and monitoring in action for the zoonotic diseases. The Department of Health Service don't undertake surveillance programmes unless the control management programme is linked to the surveillance plan of the disease, and the disease of concern is of epidemic nature. Hence, the zoonotic diseases that implement control management programme, are regularly monitored and have surveillance plan conducted by the Department of Health Service. Among these diseases, most of them are vector born diseases like Malaria, Kala-azar, Lymphatic Filariasis, Dengue, Japanese Encephalitis and some other diseases of importance like Rabies, *HIV/AIDS,* Tuberculosis and Leprosy.

Routine and outbreak investigation of Dengue, Leptospirosis, Brucellosis, Chickungynya, Cysticercosis and Echynococcus are conducted. No surveillance on other zoonoses and the diseases has been carried out. Some pilot studies have been done in selected districts on Leptospira and *Brucella* through Massey University.

On the veterinary side, the Veterinary Epidemiology Centre has been compiling outbreak records reported from the districts for all animal diseases, while the newly established Veterinary Public Health Office compiles that for the zoonotic diseases. Surveillance and control strategy plan for six zoonotic diseases of importance in Nepal - Avian Influenza, Brucellosis, Leptospirosis, Hydatidosis, Cysticercosis and Toxoplasmosis have been developed through the Zoonoses Control Project (ZCP). However, such plan has yet to be materialized into action. During the project period of ZCP, NARC conducted sero-surveillance on five zoonotic diseases to understand the prevalence and seasonality variation of these diseases. The result indicates the prevalence of the all five diseases with toxoplasmosis and cysticercosis having higher prevalence rate. At the same time, the CVL also conducted surveillance on the same diseases and their result also shows the higher prevalence of toxoplasmosis. These surveillance plans are not in continuity.

CHAPTER III: BASELINE AND KAP SURVEY IN PROJECT DISTRICTS

The Baseline and KAP survey has been conducted with more focus on collecting information through a broad range of questions on zoonoses diseases from a specific population in the Chitwan, Rupandehi and Banke districts. At the same time, the survey has been considered to represent baseline data collected at a point of time before the ANSAB/RI intervention through improved communication. As the KAP survey represents formative as well as baseline information, focus was made to explore the knowledge on the presence of diseases, attitude and practice when establishing current situation of the diseases.

3.1 Identification of survey population

District situation in respect of physical, demographic, animal population, disease incidence, livestock production system has been reviewed from secondary sources and later verified from observation and response of the respondents to the structural questions.

Table 6: Human population in project districts

District	VDC	Area	HHs	Population	Family Size	Population Density	Municipality
		Sq. Km	No.	No.	No.	No./Sq. Km	
Banke	44	210	94,773	4,91,313	5.18	210	2
Rupandehi	52	647	1,63,835	8,80,196	5.37	647	6
Chitwan	38	261	1,32,462	5,79,984	4.38	261	6

Source: District Profile, 2014

Table 7: Animal population in project districts

Districts	Cattle	Buffalo	Sheep	Goat	Pig	Chicken	Duck
Banke	1,22,329	1,17,051	11,369	1,44,683	22,079	5,99,351	1,811
Rupandehi	1,08,875	1,16,208	3,975	2,21,286	19,350	1,070,444	23,050
Chitwan	92,081	1,20,127	2,798	1,92,224	10,342	6,429,986	21,972
Total	3,23,285	3,53,386	18,142	5,58,193	51,771	8,099,781	46,833

Source: SINA, MoAD, 2012/2013

3.2 Designing sample size

The three project districts represent different ethnic groups and cultural practices. To represent diversity of ethnic group, 70 samples per district i.e. 7 respondents from each10 project support committees identified within a district for launching the One Health Asia Programme were included in the samples. These 10 project support committees identified were scattered all across the districts covering urban and rural population both including, livestock service centres and health post, and give a perfect representation of the district population for KAP survey. List of the VDCs/Municipalities and population is presented in following table.

Table 8: Total HHs and human population by gender in the VDCs/Municipalities

SN	VDCs/Municipality	HHs	Total Population	Male	Female
BANKE					
1	Mahadevpura, Dhakeri	1,903	9,246	4,291	4,955
2	Kohalupur	8,173	36,019	17,449	18,570
3	Bankatuwa	3,883	18,792	8,772	10,020
4	Samserganj	1,648	8,470	4,189	4,281
5	Nepalganj Municipality	15,180	72,503	37,197	35,306
6	Khajura khurda	1,145	6,034	3,007	3,027
7	Kamdi	1,841	9,853	4,788	5,065
8	Hirminiya	1,442	8,463	4,413	4,050
9	Radhapur	756	3,555	1,535	2,020
10	Betahani	1,456	8,141	4,310	3,83
RUPANDEHI					
1	Devdaha	6,435	28,214	12,836	15,37
2	Butwal Municipality	29,662	118,462	58,808	59,65
3	Bhairahawa, Municipality	12,497	63,483	31,673	31,810
4	Tilotama	Amalgamated to New Municipality			
5	Sainamaina	Amalgamated to New Municipality			
6	Lumbini Adarsha Municipality	1,371	10,402	5,157	5,245
7	Dakadhai	1,104	6,965	3,478	3,487
8	Gajedi	2,517	12,423	5,804	6,619
9	Manpakadi	1,148	6,783	3,275	3,50
10	Majhagawa	851	5,606	2,809	2,797
CHITWAN					
1	Ratnagar Municipality	10,851	46,367	22,173	24,194
2	Khairahani	4,762	21,530	10,155	11,375
3	Mangalpur	4,527	19,066	8,970	10,096
4	Gitanagar	3,375	13,929	6,553	7,376
5	Meghauli	3,086	14,149	6,341	7,808
6	Jagatpur	2,635	11,195	5,217	5,978
7	Lanku, ward No 5 BNP	36,939	143,836	71,175	72,661
8	Jutpani	3,325	14,324	6,626	7,698
9	Madi, Basantapur	1,705	6,836	3,045	3,791
10	Mugling , Chandi Bhanjyang	847	4,978	2,460	2,518

Source: Population and Housing Census, 2011, Central Bureau of Statistics, Government of Nepal

3.3 Designing and development of the survey questionnaire

The questionnaire was designed in line with the project framework to explore knowledge, attitude and practice of respondents and prevalence of zoonotic diseases. 10 structural questions, each with five sub-questions were designed for knowledge, attitude and practice in consultation with the project staffs at ANSAB. Each question has a value of 10 marks; each sub question carrying 2 marks each. Similalry, for focus group discussion, structured questions were developed in line with the project framework.

Figure showing pre-testing of questionnaire at Gitanagar in Chitwan district

3.4 Pre-testing and finalizing of the questionnaire

Once the questionnaires were approved, validation of questionnaires was done with survey of a total of 7 respondents at Annapurna Dairy Cooperative, Gitanagar Chitwan on December 7, 2014.

3.5 Recruitment and training of the study team

Dr. Rishav Guragain, Mr. Suchak Sapkota, and Mr. Rajendra Dhakal were selected as enumerators for Chitwan, Banke and Rupendehi districts respectively for the study. Dr. Bhubaneswar Sharma was recruited for logistic support and focus group discussion. The team leader organized one-day training on questionnaire to the team members.

3.6 Collection of data

With the structured questionnaire, the enumerators collected the data from the three districts from December 7, 2014 to January 7, 2015. Focus group discussion especially with the butchers and meat traders was organized in the project districts to collect information on current situation

of slaughtering, processing and selling practice of meat and the knowledge of zoonoses among these actors.

3.7 Data analysis

Quality of the data was assessed with triangulation before analysis. Access software was used to develop the data entry program and the survey data was processed by district using the FoxPro software. The output tables were converted into Excel spread sheet, which was specifically simulated for this study.

Statistical parameters such as number, proportion and mean of different indicators were generated separately for each project district. The response of questionnaires on Knowledge, Attitude and Practice was separately analysed by each group, each district and the overall for the three districts.

All questions asked to measure the level of Knowledge, Attitude and Practice had 100 marks in each area. Proportion and percentage was computed by district, and by KAP level. Z-test was used to measure the level of significance of Knowledge, Attitude and Practice of each disease between the survey districts.

CHAPTER IV: SOCIO-ECONOMIC STATUS OF THE RESPONDENTS

4.1 Background and composition of the respondents

4.1.1 Gender composition

About 67.1% of the total respondents were women. As compared to the male members of the household, who are mainly involved in raising livestock, poultry and other animals for commercial use, the female members are at the direct contact with the livestock reared for their household and some commercial uses by feeding the animals and handling their wastes.

Table 9: Total number of respondents in project districts by gender

Districts	Female		Male		Total
	No.	%	No.	%	
Banke	42	60.9	27	39.1	69
Rupandehi	44	62.9	27	38.6	71
Chitwan	55	78.6	15	21.4	70
Overall	141	67.1	69	32.9	210

Source: Field Survey, 2014

4.1.2 Age groups

Most of the respondents (about 95%) fall within the economically active age groups, with more concentration of the age groups 31-40 (about 32%) followed by age groups 20-30 (21%) and 41-50 (21%). The composition of population in terms of age group is similar in the three districts.

Table 10: Total number of respondents in project districts by age group

Age in years	Banke	Rupandehi	Chitwan	Total	%
Upto 20	2	8	2	12	5.7
20-30	17	15	12	44	21.0
31-40	30	21	16	67	31.9
41-50	11	15	18	44	21.0
51-60	7	5	17	29	13.8
60 above	2	7	5	14	6.7
	69	71	70	210	100.0

Source: Field Survey, 2014

4.1.3 Location of survey centres

The surveys were taken at community level, which were at varying distance from the district headquarters showing representation of both urban and rural population of the districts. The survey centres with distance less than 10 km from the district headquarters was about 45% followed over 20 km (about 34%) and between 11 -20 km (about 22%)

Table 11: Number of respondents by distance from district headquarters

Distance	Banke	Rupandehi	Chitwan	Total	%
0 km	2	1	7	10	4.76
0-5 km	4	13	6	23	10.95
6-10 km	40	4	15	59	28.10
11-20 km	10	17	19	46	21.90
21-30 km	13	10	12	35	16.67
30 more	0	26	11	37	17.62

Source: Field Survey, 2014

4.1.4 Occupation of sample households

Livestock farming and agriculture are the main occupations of the respondents, covering of about 40% of the total respondents involved in livestock farming followed by farm based agriculture (about 38%) and poultry (over 10%). Over 5% of the respondents have trade as their major occupation.

Table 12: Percentage of the respondents by their occupation

SN	Occupation	Percentage
1	Agriculture	38.3
2	Livestock farming	39.8
3	Poultry	10.6
4	Trade	5.8
5	Wage earner	3.7
6	Foreign Employment	1.7

Source: Field Survey, 2014

4.1.5 Education

As respondents were taken mostly from farmers groups, it includes 22% having no education, 40% below primary education and 51% with higher secondary and secondary school education as in the **Error! Reference source not found.**.

Table 13: Percentage of the respondents by their education

SN	Education	Percentage
1	Illiterate	22
2	Literate	11
3	Primary	6.7
4	Secondary	35.9
5	Certificate	15.8
6	Graduate	6.7
7	Post Graduate	1.9

Source: Field Survey, 2014

4.1.6 Self-declared economic status of sample household

As most of the respondents are involved in agriculture, their household economic status is low. Over 75% of the respondents classified their economic status as weak considering their current economical status followed by very weak (10%).

Table 14: Percentage of the respondents by their economic status

SN	Status of household economy	Percentage
1	Very Weak	10%
2	Weak	76.1
3	Moderate	13.4%
4	Satisfactory	0.5%

Source: Field Survey, 2014

4.2 Assets of respondents

4.1.7 Land holdings

About 55% of the respondents have less than 0.5 ha of land, with 3.8% being landless. About 23% of the respondents possess 0.5 to 1 ha of land, and another 23% possess land more than 1 ha.

Table 15: Percentage of the respondents by their size of landholdings

SN	Land holdings	Percentage
1	Landless	3.8
2	Less than 0.5 ha	51
3	0.5 to 1 ha	22.9
4	1 to 1.5 ha	12.4
5	1.5 to 2 ha	1
6	More than 2 ha	9

Source: Field Survey, 2014

4.1.8 Ownership of animals

Households in the project rear multiple animal species with cattle (about 60%), goat (about 60%), buffaloes (about 45%), and chicken (about 45%) as the major livestock. The percentage of households raising different species of animals and number of livestock per household is similar to those of the national average provided by NSCAN, CBS, 2011.

Table 16: Percentage of respondents by their ownership of animals

Species	Banke	Rupandehi	Chitwan	Average
Cattle	52.2	43.7	80	58.63
Buffaloes	44.9	43.7	45.7	44.77
Sheep	0	0	0	0.00

Goat	60.9	53.5	60	58.13
Pig	21.7	9.9	10	13.87
Chicken	52.2	50.7	30	44.30
Duck	5.8	5.6	5.7	5.70
Dog	27.5	25.4	15.7	22.87
Cat	11.6	14.1	17.1	14.27
Others	5.8	11.3	4.3	7.13

Source: Field Survey, 2014

Figure showing human-animal interference at Kamdi in Banke

As indicated in the following table, the average number of animal holding per household is over ten for major livestock including cattle, buffalo, pig and goats. Considering the major proportion of the population having average size of land holding below 0.5 ha, the average number of animals per household indicates that they need to be crowded for rearing.

Table 17: Average number of different animals per HHs

District	Cattle	Buffalo	Pig	Duck	Cat	Goat	Poultry	Dog	Sample
Banke	2.1	0.9	2.3	0.2	0.1	2.8	125.4	0.4	69
Rupandehi	1.9	1.1	1.6	0.3	0.2	5.6	276.1	0.4	71
Chitwan	5.7	1.2	2.1	1	0.2	5.7	117.4	0.2	70
Overall	3.2	1	2	0.5	0.2	4.7	173.7	0.3	210

Source: Field Survey, 2014

4.3 System of livestock production

The current practice of livestock rearing practice and production give a very favourable environment for the spread of zoonotic diseases. About one fourth of the chicken involved free range feeding and similar percentage of the animal/birds involved semi-stall feeding, which could be the concern for the spread of zoonotic diseases. Even on the stall-feeding situation, as animal houses are found in the close proximity of human dwellings, it is not safe by any standard to prevent the spread of zoonoses. Multiple species kept on stall-fed system, without proper disease prevention measures could further favour transmission of diseases.

Pasturing pigs at *Bari land* and too many dogs in close contact with animals and human have been providing a favourable environment for the easy access and spread for zoonoses.

There appear extension support for commercialization of livestock production with approved housing designs, but still construction locations were found close to human residences without organizing proper safe disposal of waste materials from animals. In most of the places, virtually the human and animals were found living in a very close proximity as one family.

Table 18: Livestock system in the project districts

Species	Free Range	Semi-stall feeding	Stall Feeding
Cattle	0.8	26.4	72.8
Buffaloes	0	30.6	69.4
Goat	1.6	33.6	64.8
Chicken	23.1	11	65.9
Total	6.3	25.4	68.225

Source: Field Survey, 2014

Figures showing modern piggery at Kohalpur in Nepalgunj and pigs being pastured in Banke

4.4 Use of animal and poultry waste

Most of the animal wastes are used for the production of compost manure (about 65%) in the project districts. Following the use of wastes for manure, it is used mainly for producing energy, which includes biogas (37%) in Chitwan district, and for cooking in other two districts. More than 20% of the animal waste, especially dung is used for cooking.

Table 19: HHs use of animal & poultry wastes

Districts	Biogas production		Firewood use for cooking		Manure use		Response	Sample
	No.	%	No.	%	No.	%	No.	
Banke	13	12.3	25	23.6	68	64.2	106	69
Rupandehi	10	11	19	20.9	62	68.1	91	71

Chitwan	38	37.3	0	0	64	62.7	102	70
Overall	61	20.4	44	14.7	194	64.9	299	210

Source: Field Survey, 2014

4.5 Source of drinking water

Overall, the ground water is the major source of drinking water in the project districts that are extracted from the tube wells and well. About 50% of the respondents in Rupandehi and 35% in Chitwan used tap as their source of drinking water. Collection of water from springs and river is negligible.

Table 20: Source of drinking water used by the respondents

SN	Source of Drinking water	Banke	Rupandehi	Chitwan	Total %
1	Tap	8	50	35	33
2	Tube well	84	36	42	52
	Deep tube well	8	11	15	12
	Well	0	11	4.6	2.2
3	Spring Water	0	2.0	2.2	1.8
4	River	0	0	1	1

Source: Field Survey, 2014

4.6 Toilet use

Most of the respondents use closed toilets. Chitwan appears free of open toilets and has modern toilets in comparison to other districts. Over 98% of the respondents in Rupandehi district use closed toilets. In Banke district, 32% of the respondents use open toilets despite the effort to make the district free from open defecation.

Table 21: Type of toilets used by the respondents (%)

District	Open toilet	With septic tank	Without septic tank	Modern with flush
Banke	32.2	33.9	32.2	1.7
Rupandehi	1.4	57.7	40.8	0
Chitwan	0	71.8	8.5	19.7
Overall	10	55.7	26.9	7.5

Source: Field Survey, 2014

CHAPTER V: MEDICAL AND VETERINARY HEALTH SERVICES AND PRACTICES IN THE PROJECT DISTRICTS

5.1 Source of information for human diseases

Television and local FM radio are the major sources of information for human diseases in the three districts followed by national radio and newspapers. It is important to note that the village health workers are also the important source of information on human diseases.

Table 22: Source of information on human diseases in project districts

Source	Banke	Rupandehi	Chitwan	Total	%
Training from health workers	5.8	15.7	21.4	14.3	5.6
Newspaper	14.5	17.1	51.4	27.7	10.8
TV	58	80	74.3	70.8	27.6
Radio/Local FM	59.4	85.7	64.3	69.8	27.3
National radio	21.7	30	42.9	31.5	12.3
Leaflet/pamphlet	2.9	11.4	15.7	10.0	3.9
NGOs	0	5.7	18.6	8.1	3.2
Village health workers	15.7	12.9	15.7	14.8	5.8
Others	21.7	5.7	0	9.1	3.6

Source: Field Survey, 2014

5.2 Source of information for animal diseases

There is variation between the districts, but as for the case of human diseases, television, local FMs and national radio appeared major sources for the information. It is important to note the role of village animal health workers and the training from the health workers for disseminating the information on animal diseases in the three districts. The village animal health workers were the major source of information in Chitwan districts.

Table 23: Source of information on animal diseases in project districts

Source	Banke	Rupandehi	Chitwan	Total	%
Training from health workers	13	21.4	40	74.4	10.2
Newspaper	17.4	22.9	27.1	67.4	9.2
TV	56.5	72.9	28.6	158.0	21.6
Radio/Local FM	58	77.1	38.6	173.7	23.8
National radio	21.7	34.3	28.6	84.6	11.6
Leaflet/pamphlet	0	10	11.4	21.4	2.9
NGOs	8.6	4.3	8.6	21.5	2.9
Village animal health workers	7.2	20	74.3	101.5	13.9
Others	23.2	4.3	0	27.5	3.8

Source: Field Survey, 2014

5.3 Treatment received by the people from the type of health service providers

The public health professionals mainly doctor and health assistant are the major health service providers in the three districts. In Chitwan and Rupandehi districts, more than 65% of the respondents received the services from these professionals. While in Banke district, slightly less than 50% of the respondents received services from the traditional healers. Social health workers and village health workers also provided significant health services in the project districts.

Table 24: Treatment received by the people from the different service providers

Service providers	Banke	Rupandehi	Chitwan	Total	%
Doctor	37	49.6	57.8	144.4	48.9
Health Assistant	21.1	17.6	21.1	59.8	20.3
Social Health Workers	9.4	3.4	7.3	20.1	6.8
Baidya	0.7	2.5	1.8	5.0	1.7
Village Heath workers	4.6	9.2	4.6	18.4	6.2
Traditional Healers	22.5	17.6	7.3	47.4	16.1

Source: Field Survey, 2014

5.4 Health service providers in the project area

Almost all VDCs of the project districts have the health posts for the medical treatment. There are 53 service unites in 38 VDCs of Chitwan, 70 units in 52 VDCs in Rupandehi and 48 units in 44 VDCs in Banke districts. It doesn't include 17 Urban Health Centres, which is about uniformly distributed in the three districts. There are many new buildings under construction to improve the facilities at the health post in accordance to the government policy to upgrade of the sub-health post to health posts and the health post to primary health centre.

Table 25: Hospitals and service centres in the project districts

Institutional Type	Banke	Rupandehi	Chitwan	Total
District Public health office	1	1	1	3
Zonal Hospital	1	1	0	2
District Hospital	1	1	3	5
Primary health centre	3	5	4	12
Health post	20	26	16	62
Sub- health Centre	24	38	20	82
Urban Health Centre	5	6	6	17

Source: Ministry of Health and Population, Government of Nepal

5.5 Veterinary service providers

In contrast to the medical service, establishment of veterinary service units in the districts are very weak, and the ratio of the available current service centres to VDC is 1: 2.5 in Chitwan, 1:2.7 in Rupandehi and 1:3.14 in Banke districts.

Many of the service centres in Rupandehi and Banke districts are in very poor condition. In Chitwan, the dairy cooperatives have maintained the condition on their own initiation by improving building condition and providing required equipment.

Table 26: Veterinary service centres in three districts

District	DLSO	Service Centre	Sub- Centres	Total	VDCs
Banke	1	4	9	14	44
Rupandehi	1	5	13	19	52
Chitwan	1	4	10	15	38

Source: Field Survey, 2014

Livestock Centers at Manapkadi in Rupandehi, Majh Gaun in Rupandehi, Kamdi in Banke and Gitanagar in Chitwan districts

5.6 Veterinary manpower in the districts

There are three officers, around 25 to 38 para-professionals and 82 to 162 village animal health workers per district. It is interesting to note that that large part of clinical veterinary service is in the hands of para-veterinary professionals, who often posses very little knowledge on zoonoses. The following table presents the treatment received by the local community from the different types of veterinary service providers, which also indicates the role of the para-veterinary professionals, from whom slightly less than half of the respondents received service.

Table 27: Veterinary manpower in project districts

Staff	Banke	Rupandehi	Chitwan	Total
Senior Veterinary Officer	1	1	1	3
Veterinary Officer	1	1	1	3
Live stock Officer	1	1	1	3
Junior Technicians	5	6	8	19
Junior technical Assistant	15	17	12	44
Total	23	26	23	72
VAHW	82	162	117	361
Service Centers	4	5	4	13
Sub Centers	9	13	10	32

Source: Field Survey, 2014

Table 28: Treatment received by people from different veterinary service providers

Service providers	Banke (%)	Rupandehi (%)	Chitwan (%)	Average (%)
Doctor	20.3	40.8	24.8	28.63
JT/JTA	24.3	35.7	51.2	37.07
VAHW	11.5	6.1	13.2	10.27
Traditional Healers	7.4	2	1.7	3.70
Baidya	12.2	8.2	3.3	7.90
Traditional Remedy	24.3	7.1	5.8	12.40

Source: Field Survey, 2014

5.7 School education in project districts

The three project districts have 1,895 schools with 0.934 millions of students in total. Literacy rate of 70.57% is higher to the national average of 65.9% except in Banke. The existing curriculum has the Health, Population and Environment Education as one of the core subjects at secondary level. Similarly, a comprehensive compulsory health education subject has been introduced in school education from class one to class ten focusing on personal hygiene, environment and sanitation, food and nutrition, disease prevention, first aid, health services and ill effects from smoking and narcotic drugs. The curriculum includes the important diseases such

as vector borne diseases, communicable and non-communicable diseases, and those transmitted through faecal matter.

Although there is a provision that teachers need to be trained specially with B.Ed. (Health Education) to increase the quality of education, it was found during he study that about 60% of the schools didn't have the trained teachers in the schools in the project districts.

Table 29: Number of schools and students in project districts

Type of Schools	Banke	Rupandehi	Chitwan	Total
Primary school	431	587	521	1,539
Lower Secondary school	200	352	283	835
Secondary school	125	231	196	552
Higher secondary school	50	77	65	192
Total	806	1247	1065	3,118
Literacy rate	65%	69.75	76.98	70.57

Source: School Level Educational Statistics of Nepal, 2011, Department of Education and Concerned District Education Offices, 2015

Above 25% of the total population in the project districts are in the school education. It provides an opportunity to reach a large population for mass awareness and prevention through the school education system with some specific focus on concerned zoonotic diseases. The schools lack proper audio-visual means and teaching aids, which could be provided to improve the quality of education to include the important health messages in the project districts.

Table 30: Enrolment of student in different type of school

	Banke	Rupandehi	Chitwan	Total
Primary school	91,322	1,20,623	68,479	2,80,424
Lower Secondary school	29,936	52,796	39,385	1,22,117
Secondary school	14,336	24,710	22,259	61,305
Higher secondary school	7,446	11,448	10,601	29,495
	1,43,040	2,09,577	1,40,724	4,93,341

Source: School Level Educational Statistics of Nepal, 2011, Department of Education and Concerned District Education Offices, 2015

5.8 Butchers shops and slaughter practices

Meat has been traditionally viewed as a vehicle for a significant proportion of human food-born diseases. Importance of many of such meat-born pathogens such as *Escherichia coli* O157:H7, *Salmonella* spp., *Campylobacter* spp., *Yersinia enterocolitic and* Bovine Spongiform Encephalopathy (BSE) have been realized big hazard at global level beside the other conventional infectious diseases.

In a country like Nepal, where the competent authority has no legal power to set and enforce regulatory meat hygiene requirements, it has been a major etiological cause for the spread of

prevalent zoonoses. The study collected the following information on the current situation of slaughtering, processing and selling practice of meat and the knowledge of zoonoses among butchers.

- 19% did not know that zoonoses are spread from meat
- Besides Avian influenza, most of them could not mention 3 zoonoses
- While slaughtering animal, butcher used 44.12% Jhatka, 26,47 Halaland 29,41% other methods
- 98% committed not to slaughter sick animals
- Besides larger meat suppliers others used very basic equipment in slaughtering and selling meat. Khukuri, Aachano, Dawa, knife, spear, sickle, Axe, Khuda, Balance
- Only 68% butchers cleaned the equipment after dressing
- 66% cleaned Dressing table and Achano Meat Cutting Board) but not with disinfectants.
- 91% used drinking water for dressing
- 67% used Apron
- 17% meat shop were operated in open place
- 98% said not to allow carcasses to contact soil.
- In case of cystic carcasses;
    - 18% removed the cyst from carcasses and sold
    - 37% throw away infected organs or part of it
    - 23% condemned the whole carcasses (very unlikely)
    - 17% fed the infected organs to dog and pig
    - 4% sold as meat
- 8% kept meat in open place till the sale was completed
- 91% used the refrigerators
- Butcher's shop wastes, ingesta were disposed by 66% in the pit, 24% in the sewage drainage, 6% at nearby open land, and 3% at municipality containers.
- Target districts as are all from Tarai, slaughtering of buffalo and pig is not common as in goat and chicken. Butchers that are involved in buff and pork trading were observed of relatively low in education and are given lower social status, as compared to those selling chevron and chicken.
- Butchers associated with buffalo meat and pork business complained that the concerned officials from the governmental and non-governmental organization pay little attention for promotional activities.
- Except goats, other animals, including poultry, are slaughtered in relatively young stage
- Gradually use of tiles, marbles at meat shop is becoming a common practice except in small entrepreneurs
- Most of the meat shops of the towns appeared relatively in good condition, but most of the butchering business in buff meat and pork place appeared bad.




Meat shops with their own slaughter place in the project districts


Meat shops selling halal meat at Nepalgunj in Banke


Poultry slaughter at Kohalpur in Banke *D.K. Meat Product at Nepalgunj in Banke*

Figures showing slaughter places and meat shops in the project districts

a. Problems faced

- Lack of clean water in some slaughtering places.
- Difficulty in disposing animal wastes.
- Meat supply is not taken as essential food commodity to ensure food security in the urban areas.

- There is monopoly of big traders and small butchers are losing business in municipality areas.

b. Suggestions from the Butchers for the improvement

- Every city or town should fix a place for Slaughtering animals and birds with adequate facility for disposal of slaughter waste.
- Meat shops should not slaughter animals themselves within the vicinity of the meat-marketing place.
- Legal enforcement is a must, but it should be promotional as well.
- Modern slaughter equipment is not within the reach of small butchers shop operators.
- At least 7 days' training should be given about zoonotic diseases
- Refresher training is conducted to mitigate knowledge gaps.
- Use of apron, gloves, masks, gum boots and caps should be made compulsory and this should be monitored regularly
- As far possible Nepalese consumers are avoiding consumption of frozen meat and there is need of creating mass awareness regarding the importance of frozen meat.
- There should be strict prohibition of selling meat in open places.
- A moderate standard for wholesome meat should be fixed and only standard qualifying meat be allowed for sale.
- Meat inspectors should assist in promoting hygienic meat production system, and should not be only regulatory body to harass traders.
- Use of flex board at important places for awareness about bio-security and zoonotic disease is necessary
- Female animal slaughter is not allowed and very often penalty is imposed from CDO office.

Legislation related to food safety and quality in Nepal

- Food Act, 1966, and Food Regulation, 1979
- Feed Act, 1976 and Feed Regulation, 1984
- Consumer Protection Act, 1998
- Slaughterhouse and Meat Inspection Act, 1998
- Nepal Standard Act and Rules, 1980
- Pesticide Act, 1991 and Pesticide Regulation, 1993
- Local Self-Governance Act, 1999
- Standard Weights and Measures Act 1968 and Rules, 1970
- The Animal Health and Livestock Service Act, 1998
- Iodized Salt Act, 1999

5.9 Dairy

Milk is a perfect media for the growth of zoonoses pathogens, and often the poor handling and quality of milk is blamed for the quality dairy products. Although there is some chilling centres in the project districts to preserve the quality of milk, the lack of milking hygiene including milking of sick animals is observed in the project districts that could spread the milk born diseases in the districts.

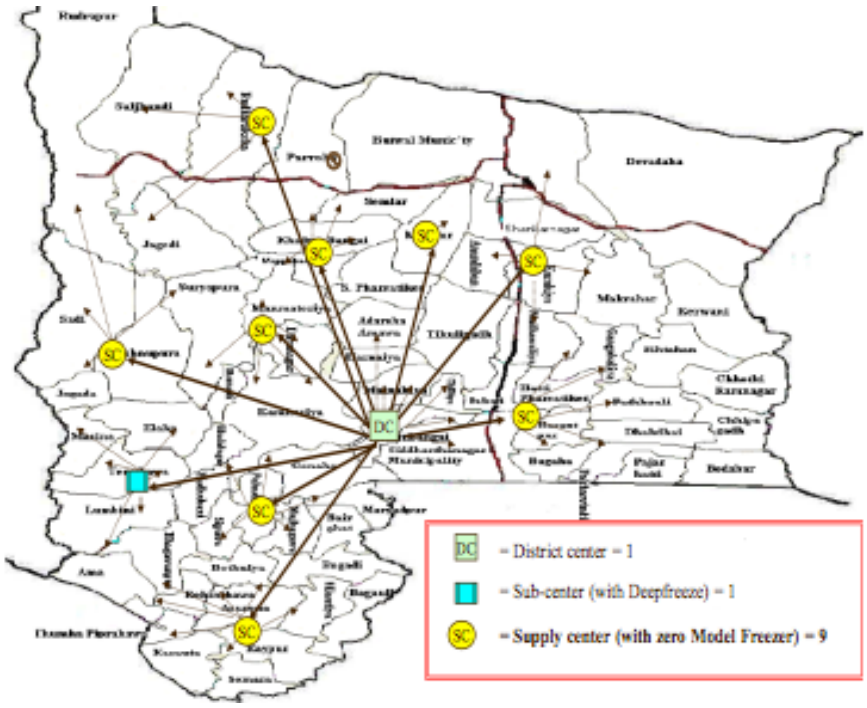
Large part of milk production in the districts is initiated through dairy cooperatives (which are more than 100 in number in each district), and KAP score on milk born disease is not very satisfactory. It could be an important area to include in the project awareness activities.

Bankatuwa Milk Producers' Cooperative in Banke district

5.10 Cold chain system

Consistent flow of electricity is the prerequisite of maintaining cold chain system for storing vaccine and biological matters. Realizing the irregularity of electricity supply in the country, the DPHO has maintained cold chain facility to ensure quality of vaccine for immunization programs in the districts at some strategic points that are within the easy reach of the health centres. The following map illustrates the cold chain movement system by DPHO with the case from Rupandehi district, where 9 supply centres with zero model freezers, one sub –centre with deep freezer and one district centre are taken into action at the time of immunization program.

Figure 5: Vaccine supply route in Rupandehi district



Source: District Public Health Office Rupandehi, 2014.

There is no such provision in DLSOs. The vaccines/ biological are stored at DLSO for the field uses are supplied in cold boxes to the service centres. Except in Chitwan, most of the livestock service centres in other districts don't have refrigerators even for maintaining cold chain system for short term. Private companies supplying drug and vaccines, which are regulated by the

Department of Drug Supply and are subjected to regular inspection, maintain their own reliable cold chain system.

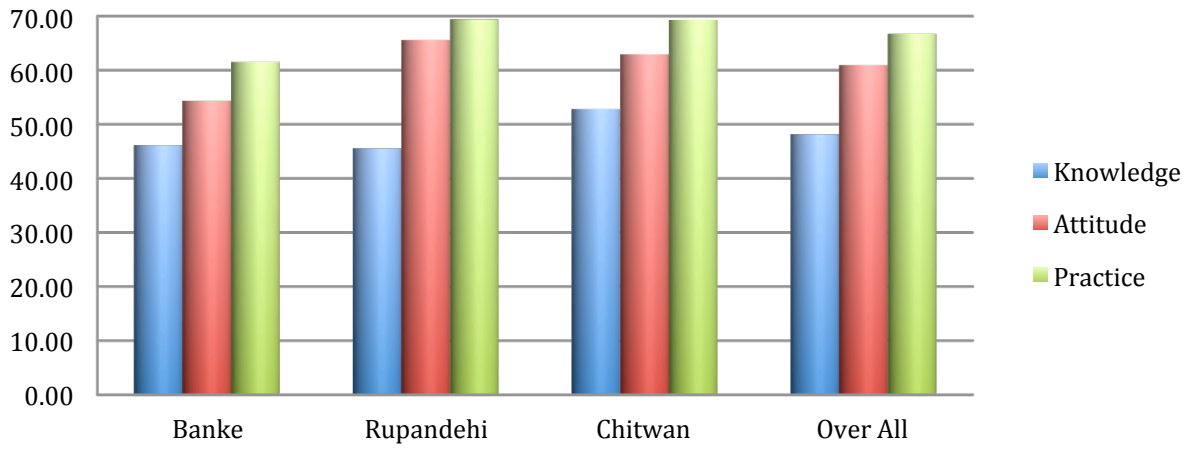
5.11 Drug supply

Except the free drug prescribed and distributed from the health posts, the private sector supplies the drug for both veterinary and medical need under the regulation of the Department of Drug Administration, Ministry of Health and Population. Drug shops are licensed to the pharmacist for medical drugs and to the VAHW and others for veterinary drugs. Once the demand for the treatment of zoonoses is created, the private sector could adequately ensure the supply of drugs.

CHAPTER VI: KNOWLEDGE, ATTITUDE AND PRACTICE RESULT

The overall KAP score of the three districts us presented in the table and figure presented below. Chitwan district has scored the highest marks in all three behaviours of Knowledge, Attitude and Practice, followed by Rupandehi and Banke. Interestingly, all three districts exhibited low score in Knowledge than in Attitude and Practice. The cultural behaviour in the districts could be the major reason of good score in Attitude and Practice, although the respondents exhibited low score in knowledge.

Figure 6: KAP score of the districts



Source: Field Survey, 2014

Table 31: Overall KAP score of the districts

Districts	Knowledge	Attitude	Practice
Banke	46.14	56.70	59.74
Rupandehi	45.56	74.39	65.49
Chitwan	52.83	71.49	64.14
Over All	48.18	67.53	63.12

Source: Field Survey, 2014

6.1 Z-value

To access the relation among Knowledge, Attitude and Practice, Z-test was computed for each district separately on each district data. The result shows that Z-value between knowledge and attitude is significant in Rupandehi and Chitwan districts. The Z-value on Knowledge and practice is significant in all the three districts. However, attitude and practice is significant only in Banke district, which had low score in both behaviours.

However, in the average of data of all three districts, the Z-test is significant among knowledge and attitude, knowledge and practice and attitude and practice.

The result indicated that knowledge dictated both attitude and practice, but attitude alone could not influence the practice. This often happens between observable and none observable behaviour.

Table 32: Z-test between KAP of individual district

District	Knowledge-Attitude	Knowledge-Practice	Attitude-Practice
Banke	1.3	9.3	6.6
Rupandehi	7.3	12.4	0.9
Chitwan	4.9	6.3	0.2
Overall	**4.5**	**9.3**	**2.4**

Note: Z-value > 1.96 is significant at 95% confidence level

Statistical test and correlation coefficient of each questions was computed between different districts based on response to Knowledge, Attitude and Practice. As Chitwan scores higher marks in **Knowledge**, the Z-value on knowledge is significant between Banke and Chitwan and Rupandehi and Chitwan, but there was no difference between Banke and Rupendehi.

In the case of **Attitude**, Z- value is significant between Banke and other two districts but there is no significant level between Chitawan and Rupendehi.

However, the Z-value on **Practice** is not significant in all three districts, which indicated similarity in practice.

Table 33: Z-test between districts

District	Knowledge	Attitude	Practice
Banke-Rupandehi	0.38	**5.57**	1.90
Banke-Chitwan	**3.25**	**6.33**	0.92
Rupandehi-Chitwan	**3.01**	0.40	1.29

Note: Z-value > 1.96 is significant at 95% confidence level.

6.2 Correlation coefficient

The correlation coefficient on knowledge, attitude and practice between three different districts was not significant.

Table 34: Correlation between districts

District	Knowledge	Attitude	Practice
Banke-Rupandehi	-0.10	-0.07	-0.02
Banke-Chitwan	0.02	-0.07	-0.13
Rupandehi-Chitwan	0.14	-0.05	0.11
Average	0.02	-0.06	-0.01

Note: 0.25 is significant value at 68 degree freedom.

The correlation coefficient between knowledge-attitude, knowledge –practice within the districts is significant in Chitwan and Rupandehi, but was insignicant in Banke. Correlation coefficient between attitude-practice resulted significant in all three districts. Although, Z value was significant between Knowledge and attitude, and Knowledge and Practice, but correlation was not at significant level. On the contrast of Z test, Correlation coefficient between attitude and practice was found significant in all three district indicating practice influencing the attitude. It appears that present attitude is established on practice adopted by communities based on beliefs and cultural norms.

However, Chitwan shows strong correlation between knowledge, attitude and practice.

Table 35: Correlation between KAP by district

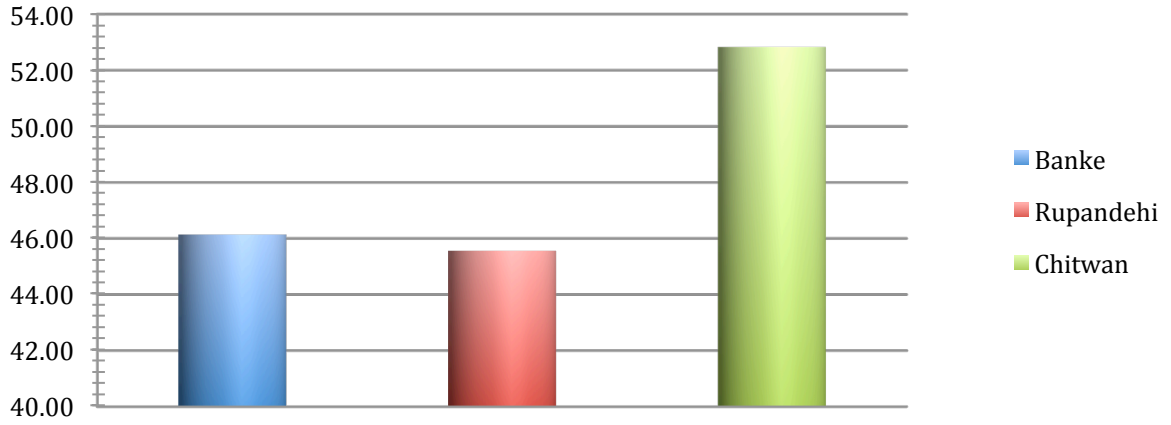
District	Knowledge-Attitude	Knowledge-Practice	Attitude-Practice
Banke	-0.016	0.020	0.474
Rupandehi	0.135	0.337	0.492
Chitwan	0.492	0.303	0.357
Overall	0.20	0.22	0.44

Note: 0.25 is significant value at 68-degree freedom.

6.3 Knowledge

The low score in knowledge indicates the need of awareness. Chitwan respondents have relatively higher score; and overall score of three districts is presented in the table No27 and in table No.27mark scores in different response area.

Figure 7: Score on Knowledge



Source: Field Survey, 2014

Table 36: Overall score on Knowledge

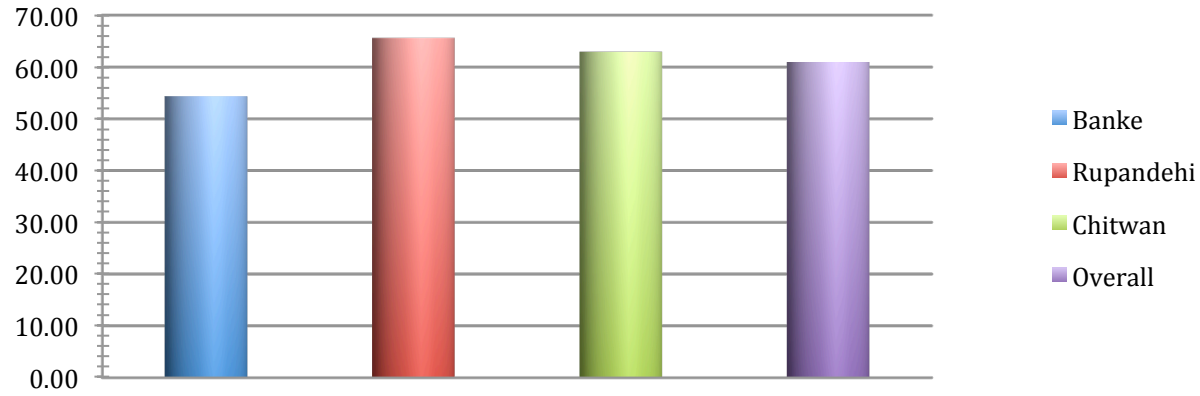
Districts	Q. No 20	Q. No 21	Q .No 22	Q. No 23	Q. No 24	Q. No 25	Q. No 26	Q. No 27	Q. No 28	Q. No 29	Total
Banke	5.59	5.01	4.37	3.22	5.16	6.32	6.41	4.55	4.87	0.64	46.14
Rupandehi	7.04	6.03	3.70	2.90	4.48	6.17	5.94	2.76	5.07	1.46	45.56
Chitwan	8.59	7.17	3.45	3.00	5.06	6.17	6.23	3.29	7.06	2.83	52.83
Overall	7.07	6.07	3.84	3.04	4.90	6.22	6.19	3.53	5.67	1.64	48.18

Source: Field Survey, 2014

6.4 Attitude

Despite the low knowledge score, reasonable attitude score results from the cultural behaviour of the population.

Figure 8: Score on Attitude



Source: Field Survey, 2014

Table 37: Overall score on Attitude

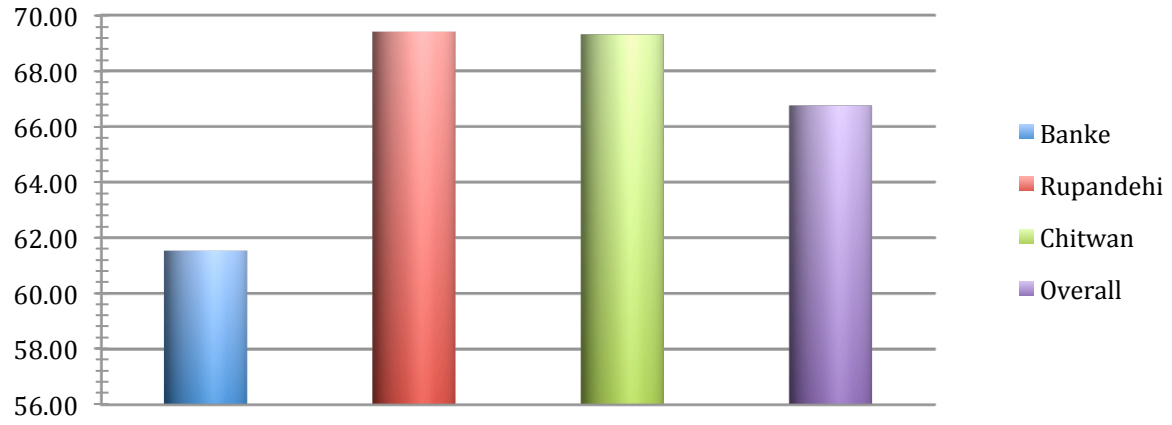
Districts	Q No 30	Q No 31	Q No 32	Q No 33	Q No 34	Q No 35	Q No 36	Q No 37	Q No 38	Q No 39	Total
Banke	2.35	6.17	5.16	7.42	3.59	4.17	7.25	8.49	7.83	4.26	56.70
Rupandehi	5.15	9.32	6.70	8.54	5.15	5.94	7.41	9.49	9.38	7.30	74.39
Chitwan	6.43	9.26	5.74	8.34	5.06	5.80	8.23	8.46	8.46	5.71	71.49
Overall	4.66	8.27	5.87	8.10	4.60	5.31	7.63	8.81	8.55	5.76	67.53

Source: Field Survey, 2014

6.5 Practice

Reasonable score has been achieved from the response to structural questions, but in many areas it is seen that these behaviour are in different prospective. Disposal of dead animals as in picture was seen in the field, despite the good response score on structural questions. Banke district has the lowest value as compare to other districts.

Figure 9: Score on Practice



Source: Field Survey, 2014

Table 38: Overall Score on Practice

Districts	Q No 40	Q No 41	Q No 42	Q No 43	Q No 44	Q No 45	Q No 46	Q No 47	Q No 48	Q No 49	Total
Banke	5.77	6.03	6.12	3.97	7.25	7.25	5.77	8.61	2.75	6.23	59.74
Rupandehi	8.11	8.06	7.13	4.37	6.00	6.00	5.35	9.75	3.92	6.82	65.49
Chitwan	9.29	8.63	6.14	3.80	4.43	4.43	6.69	8.71	5.11	6.91	64.14
Overall	7.72	7.57	6.47	4.05	5.89	5.89	5.94	9.02	3.93	6.65	63.12

Source: Field Survey, 2014

Result of response to each question with KAP score is presented in appendix No.1 Based on the response on KAP questionnaire, some important referral behaviours are presented in appendix No.2.

CHAPTER VII: CONCLUSION

7.1 KAP inferences

Poor score in knowledge indicated that there is need of awareness in zoonoses in all three districts. Knowledge was found an influencing factor to set attitude and practice. However, in the average of data of all three districts, the Z-test is significant among knowledge and attitude, knowledge and practice and attitude and practice.The result indicated that knowledge dictated both attitude and practice, but attitude alone could not influence the practice. This often happens between observable and none observable behaviour.

Chitwan looks better in knowledge in comparison with other districts. In attitude, Banke differed from other two districts; and there is similarity in practice in the three project districts. From the KAP result, it appears that Banke district needs more intensive effort to improve zoonoses preventive measures, and as zoonoses environment are alike, similar type of communication materials developed could be applicable in all three district as teaching materials.

7.2 Housing animals

Present housing system of animals by any standards; give a very favourable environment for the spread of zoonotic diseases. Multiple species kept together within the premises of human dwellings bring all the hosts together to complete pathogen cycle, and environment for quick transmission for zoonotic diseases. Even in stall-feeding system, animals are housed close to human dwelling, for various reasons like, predation, theft, land scarcity etc.

7.3 Milk born diseases

Large part of milk production in the districts is initiated through Dairy Cooperatives (more than 100 in each district), and KAP score on Knowledge, Attitude and Practice on milk borne disease is not very satisfactory. There exist knowledge gap on milk borne diseases which is also reflected in attitude of the people, such as using milk from sick cows and consumption of milk from cows with mastitis, Thus, awareness in milk borne diseases and good hygienic practice in milk production seems important on zoonotic diseases like Brucella, TB, and Mastitis.

7.4 Parasitism

Because of knowledge gap, the undesired consequences from the parasitic diseases are not fully understood among the respondents.

7.5 Awareness pogramme

Communication massage received from TV, Local FM radio, Village Health Workers, Village Animal health Workers were found effective to reach larger part of the population.

7.6 Medical service

There is very good set up of medical institutions to render service for rural population from the public sector with improving situation in laboratory service for diagnosis of diseases. Once the policy dictates importance to the zoonoses, the sector has the capacity to manage the diseases.

7.7 Veterinary service

Veterinary service in the districts is being managed with manpower limited in number, and even these persons spend more than 50% of working time on livestock extension activities required for the production. State run veterinary service is in line of free service as in medical, but has very scarce financial support. Livestock population is increasing, commercialization of production is encouraged to demand more effective veterinary service, but there does not exist any policy to add more manpower and livestock service centres despite the recommendation made in OIE's gap analysis.

Except in some disease control programme from vaccination, farmers are receiving veterinary service and drug supply through private clinics run by the para veterinary professionals involved in the government offices. Though there is programme for passive surveillance, reliability is question marked in absence of laboratory evidences.

7.8 Diagnostic service

There is no specialized manpower to work in the veterinary laboratories. The manpower trained for clinical services prefer clinical service, and laboratories are short of qualified workers. Even having adequate infrastructural facilities, regional laboratories are not efficiently functioning.

On the other hand, all types of hospitals and Primary Health Care Centres have laboratories run by the laboratory technicians. With little support on equipment and training, these laboratories could be functional to meet the demand of diagnostic services for the zoonoses in the districts. Once the regional laboratories come to function, the situation could be further improved by adding training programme to district laboratory technicians and analyzing referral samples from the districts.

7.9 Disease surveillance

In the recent Health Policy 2015, it has been realised that there is a need of effective collaboration with all stakeholders to establish functional participation in managing and controlling zoonotic diseases. Epidemiology and Disease Control Division is responsible for planning, implementation, monitoring and evaluation of surveillance, prevention and control activities of diseases, and mobilizes Rapid Response Team (RRT) for the outbreak control. Within EDCD, Zoonotic Disease Sub-section is given the mandate for prevention and control

of the zoonotic diseases. On the veterinary side, with very limited manpower and financial resource, Veterinary Public Health Office within AHD has the mandate for the development of action plan for the identification, prevention, control and eradication of zoonotic diseases.

There is need of a policy and financial commitment of the Government of Nepal for launching an effective surveillance plan for zoonoses from the joint efforts of these two organizations.

7.10 Butchers' shops and slaughter practices

Most of the responses on attitude could not be observed in practice. Most of the people involved in butchering started business without acquiring adequate knowledge of zoonoses and meat hygiene. This has resulted to the insufficient of maintenance of hygienic condition and meat quality towards the production of wholesome meat. Meat is exposed for long time in open place and storing that back in refrigerator does not seem to avoid spoilage.

New clean meat shops, developing fly proof meat sale booths, indicate willingness for change in behaviour. Butchers expressed willingness for the change, but feel that they are not receiving guidance and proper knowledge. We also noticed that there are some quite larger companies processing meat for distant market of Kathmandu, Pokhara, and other big cities in the volume of 30 to 100 MT per months. Such large meat suppliers have their own moderately equipped slaughterhouse and cold chain facilities. However, even in such large enterprises meat inspection for ante-mortem and post–mortem at slaughter place is not followed. Meat business in the districts has become a growing enterprise. The Annual turnover from a butcher shop from 175 butchers shop of Rupendehi turn out to be in substantial amount of Rs.3.6 million to 71.3 million (DLSO, Rupendehi). Such shops are registered to DLSOs, and Chitwan district alone has more than such 600 shops.

There are also district program to upgrade meat shops and hygienic meat production, but these programmes are not run within the jurisdiction of Slaughterhouse and Meat Inspection Act, 1998.

Positive enthusiasm for the change was expressed by the butchers and people engaged in meat business, running effective training program together with DLSOs on code of practice required by the small scale slaughter place and meat shops, could be the best option to bring the behaviour changes in butchers' practice.

7.11 Cold chain system

Except in Chitwan, most of the livestock service centres in other districts did not have refrigerators even for maintaining cold chain system for short term. Private companies supplying drug and vaccines are regulated by the Department of Drug Supply and are subjected to regular inspection to maintain their own reliable cold chain system.

In medical system, each DPHO has developed their own system to ensure quality of biological and vaccines.

7.12 Drug supply and demand

Drug shops are licensed to the pharmacist for medical drugs and to the VAHW and others for veterinary drugs, have been maintaining good supply of the drugs within the districts. Once the demand for the treatment of zoonoses is created, the private sector could adequately ensure the supply of drugs.

7.13 School education

Literacy rate of 70.57 in the project district is higher to national average of 65.90. Annual enrolment of student number is around 0.49 millions, and could be a good opportunity to create awareness on zoonoses in larger communities through school system.

7.14 Research

Medical and veterinary colleges could be more effective to conduct the research work, as the researcher in these institutes could be very enthusiastic in their work while pursuing for the degree. Banke Medical College, Veterinary College, Rampur were interested to be the centre for zoonoses research, and the former claimed that they have enough laboratory equipment and other prerequisites for the research.

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APPENDICES

Appendix No. 1: Mark scored on responses

1. Mark scored on Knowledge

Q. No.	Question	Response Area	Response				Marks obtained
			Yes %	No %	Don't know %		
1	Knowledge on transmission of diseases from animal to human	Drinking raw milk from sick animal	51.5	41	7.6		1.1
		Eating meat from sick animal	65.2	27.6	7.1		1.3
		Keeping close contact with sick animals	64.8	27.1	8.1		1.3
		From the bite of sick animals	74.3	21.4	4.3		1.5
		Food coming in contact with dung/urine of animals	69	25.2	5.7		1.4
		Average	**69.37**	**24.57**	**6.03**		**1.33**
		Total					**7.07**
2	Knowledge on transmission of diseases from birds to human	Coming in contact with sick bird	66	24.4	9.6		1.31
		Eating dead bird	65.2	27.6	7.1		1.23
		Housing birds within human residence	64.4	25	10.6		1.27
		Eating egg from sick birds	53.1	33	13.9		1.06
		Dressing chicken bare hand	60.1	27.9	12		1.19
		Average	**61.76**	**27.58**	**10.64**		**1.22**
		Total					**6.08**
			Incidence (%)				
			Cattle	**Buffalo**	**Goat**	**Pig**	
3	Response on Brucella infection	Abortion	68.1	67.6	58.1	18.1	0.86
		Infertility	70.5	66.7	52.4	15.7	0.84

4	Knowledge in Cysticercosis	Buffaloes	21	26.5	52.5	0.40
		Goat	69.5	8.4	22.2	1.34
		Sheep	7.4	32.6	6o	0.12
		Pig	23	25	52	0.43
		Proglotis in human stool	38.4	21.2	40.4	0.74
		Average	**31.86**	**22.74**	**41.77**	**0.61**
		Total				**3.04**
5	Knowledge in Teaniasis	Gid in sheep and goat?	74.6	12	11.5	1.51
		Larger solid type of cyst in the liver, lung and muscles of meat animals	41.1	21.5	37.3	0.82
		Epilepsy in human	85.6	4.3	10	1.70
		More larger solid type of cyst in the liver of the animals of dog keeping households	23.3	18.4	58.3	0.46
		People receiving surgical treatment	20.2	16.8	63	0.40
		Average	**48.96**	**14.6**	**36.02**	**0.98**
		Total				**4.90**
6	Response on Toxoplasmosis	1.Have you suffered from eye disease with symptoms of Red eye, pain, sensitivity to light (photophobia), tearing of the eyes , blurred vision and self recovery within a month	78.6	14.8	6.7	1.57
		2.How common is abortion in sheep and goat	80.4	7.4	12.3	1.68
		3. How common is miscarriage, a stillborn child and child born with red eyes in the villages?	66.8	12	21.2	1.56
		4. Do you know cats can transmit diseases to people?	38	43.3	18.8	1.32
		5.Do you know soil are full of germs to cause diseases	50.7	33.5	15.8	0.75
		Average	**62.9**	**22.2**	**14.96**	**1.24**
		Total score				**6.22**
7	Knowledge on various diseases: Rabies, TB, Leptospirosis, etc	1.How often you find rabid dog in the villages	75.7	14.8	9.5	1.51
		2.Have any one suffer from TB in the village	88.5	7.7	3.8	1.75
		Have you notice people falling sick showing symptoms of fever, frequent urination, skin rash, stiff neck abdominal discomfort, red conjunctiva and jaundice	70.3	17.2	12.4	1.40

		during rainy season				
		4.Do you know cats and rats can cause diseases in human	44	36.4	19.6	0.88
		5.Have any one seen buffaloes dyeing with black blood coming from mouth and anus after death	33.5	23.2	43.3	0.65
		Average	**62.40**	**19.86**	**17.72**	**1.24**
		Total score				**6.19**
8	Knowledge about diseases transmitted from milk/egg/meat	Stomach Pain	36.7	47.6	15.7	0.73
		Dirrhoea	36.2	48.6	15.2	0.72
		Vomition	36.7	48.6	14.8	0.73
		Fever	33.3	50	16.7	0.67
		Head ach	33.7	49.5	16.8	0.67
		Average	**35.32**	**48.86**	**15.84**	**0.70**
		Total score				**3.52**
9	Response regarding Japanese Encephalitis	Onset of high fever	64.3	27.1	8.6	1.29
		Stiff neck and headache	10	77.6	12.4	1.02
		Seizures (fits)	57.1	32.9	10	1.14
		Inability to speak	49.5	36.7	13.8	0.99
		Paralysis	61.4	26.2	12.4	1.23
		Average	**48.46**	**40.10**	**11.44**	**1.13**
		Total score				**5.67**
10	Response on milk Born Diseases	TB (Kshaya Rog)	41	52.4	6.7	0.82
		Anthrax (Patke)	10	77	12.4	0.2
		Brucellosis (KuJe)	5.7	84.3	10	0.11
		Typhoid/Paratyphoid (Myadhi jaro).	13.9	78	8.1	0.28
		Tineasis (Chepto Juga)	11.9	78.1	10	0.24
		Average	**16.50**	**73.96**	**9.44**	**0.33**
		Total score				**1.65**

2. *Marks scored on Attitude*

Q. No.	Question	Response Area	Yes %	No %	Don't Know%	Marks obtained
1	Attitude using livestock products from sick animal's	Meat	56.3	41.3	2.4	1.11
		Milk	44.2	52.4	3.4	0.88
		Offal	57.7	38	4.3	1.14
		Hide/skin	42.3	49	8.7	0.84
		Wool	34.8	48.8	16.4	0.69
		Average	**47.06**	**45.9**	**7.04**	**0.93**
		Total				**4.6**
2	Attitude using poultry products from sick birds	Meat	23	72.2	4.8	1.53
		Eggs	30.3	60.1	9.6	1,38
		Excreta contaminated food	9.6	82.3	8.1	1.80
		Excreta contaminated drinking water	6.7	85.6	7.7	1.86
		Chicken offal	14.8	78.9	6.2	1.70
		Average	**16.88**	**75.82**	**7.28**	**1.65**
		Total score				**8.27**
3	Attitude towards Brucella infection	Drinking milk from regular aborting cows	59	33.3	7.6	0.82
		Handling bare hand the placenta and fetal fluid from aborted animal	37.1	55.7	7.1	1.26
		Bare hand dressing the carcasses of aborting animals	37.9	55.3	6.8	1.22
		Reporting aborted cases to DLSO for laboratory test	53.1	23.4	23.4	0.93
		Not selling milk to consumption	37	46.2	16.8	1.65
		Average	44.82	42.78	12.34	1.18
		Total				**5.88**
4	Attitude towards cysticercoisis	Drinking water contaminated with pig faces	3.9	49.5	46.6	1.89
		Putting fingers in your mouth while handling pig	4.9	47.6	47.6	1.03
		Allowing pig to eat human excreta or feed contaminated with it	9.2	38.3	52.4	1.78
		Eating raw buffalo meat	4.8	53.4	41.8	1.89
		Use of human 'night soil' in vegetable production	23.4	61.2	15.3	1.52
		Average	9.24	50.00	40.74	1.62
		Total				**8.1**

5	Attitude towards Hydratidiosis	Meat with Hydatid Cyst can be eaten	37.9	45.5	18.7	1.28
		Faces of dog should not contaminate pasture of grazing animals	14.9	55.3	29.8	1.69
		Do you believe dog transfer tape worm infection to man and other animals?	14.4	6.7	78.97	0.29
		Will you allow dog to eat meat with cyst?	51.4	18.8	29.8	0.96
		There is no harm keeping dogs together with animals	20.3	13	66.7	0.40
		Average	27.78	27.86	44.79	0.92
		Total				**4.61**
6	Attitude response on Toxoplasmosis	Keeping cat with sheep and goat	30.6	45.9	23.4	0.61
		Not washing hand with soap after touching animals and birds	64.9	25.5	9.6	1.29
		Eating raw vegetable grown where cat faces are in abundance	63.6	18.7	17.7	1.27
		Do you mind eating meat from regularly aborting sheep/goat?	44.2	38.5	17.3	0.88
		Do you mind eating undercooked meat of animals	64.1	23.4	12,4	1.28
		Average	53.48	30.40	17.00	1.07
		Total				**5.31**
7	Attitude towards various diseases such as, Rabies, Leptospirosis, Toxoplasmosis, Anthrax	Touching rabid dog	96.2	3.3	9.5	1.92
		Can flood water cause infectious diseases c to animals and human?	70.8	23.4	5.7	1.41
		Do you mind bathing in a water contaminated with urine of animals	81.8	12.9	5.3	1.63
		Could you eat cat and rat touched food	76.8	13	10.1	1.51
		Could you eat meat from animals dying with black blood oozing from mouth and anus	59.3	12.7	27.9	1.15
		Average	76.98	13.06	11.70	1.52
		Total				**7.63**
8	Attitude toward food hygiene	Contaminated food, often having no unusual look or smell;	7.2	90.8	1.9	1.83
		Fresh blood contaminated food	11.6	83.6	4.8	1.74
		Food placed on unwashed plate that is used to held raw meat, pork, chicken and fish.	14.1	81.6	4.4	1.69

		Eating raw or uncooked meat	14.6	78.6	6.8	1.68
		Drinking contaminated water with animal dung and urine	3.4	90.2	6.3	1.89
		Average	**10.2**	**85.0**	**4.8**	**1.8**
		Total				**8.82**
9	Attitude towards Japanese Encephalitis	Keeping pig near the residence in mosquito prevailing area	14.6	30.6	54.9	1.68
		Housing ducks close to home	14.6	23.3	62.1	1.68
		Housing ducks close to paddy field	16.5	20.4	63.1	1.64
		Eating pork from the endemic area	10.2	28.3	61.5	1.75
		Weeding and draining open stagnant water and pig houses	7.3	35.9	56.8	1.82
		Average	**12.15**	**26.97**	**60.87**	**1.71**
		Total				**8.56**
10	Attitude towards milk born diseases	Drinking milk. Without boiling	17.2	82.3	0.5	1.65
		Drinking milk from sick cow	56.5	40.7	2.9	0.87
		Milking cows/buffalo while you are not well	71.8	25.4	2.9	0.56
		Drinking self coagulated milk	28.4	69.7	1.9	1.42
		Drinking milk from mastitis suffered cow	35.9	56.5	7.7	1.28
		Average	41.96	54.92	3.18	1.16
		Total				**5.77**

3. Marks scored on Practice

Q. No.	Question	Response Area	Yes %	No %	Don't Know%	Marks obtained
1	Practice in of disposing dead body of animals	Use for human consumption	18.8	78.7	2.4	1.6
		Feed to dogs/pig	25.6	69.3	5.0	1.5
		Bury in the soil	78.5	20.5	1.0	1.5
		Leave to vulture to feed	21.8	76.7	1.5	1.69
		Throw in the river	26.6	72,4	1.0	1.46
		Average	**34.26**	**61.3**	**2.18**	**1.55**
		Total score				**7.73**
2	Practice in of disposing dead body of Poultry	Dress and eat meat	12.8	86.2	1.0	1.69
		Feed to dogs/pigs	25.6	69.3	5.0	1.41
		Throw in the compost pit	78.5	20.5	1.0	1.53
		Throw in the river	21.8	76.7	1.5	1.53
		Bury in the soil	26.6	72.4	1.0	1.42
		Average	33.06	65.02	1.9	1.51
		Total score				**7.58**
3	Practice on Brucella disease	Feed to dog and cat	76.1	9.3	14.6	0.0
		Leave at open field	24.3	60.7	15	0.25
		Bury in the soil	8.3	73.5	18.1	0.53
		Throw in the river	8.3	73.5	18.1	2.0
		Leave at Compost Pit	84.4	3.9	11.7	0.04
		Average	40.28	44.18	15.5	0.56
		Total score				**2.81**
4	Practice on cysticercoisis	Remove the cyst and eat meat	76.1	9.3	14.6	1.49
		Throw away infected organs or part of it	24.3	60.7	15.0	0.48
		Condemn the whole carcasses	8.3	73.5	18.1	1.78
		Feed the infected organ to dog or pig	44.1	20.3	35.6	1.08
		Eat only after properly cooking	84.4	3.9	11.7	1.65

		Average	**47.44**	**33.54**	**19**	**1.29**
		Total score				**6.47**
5	Response to Hydatidiosis	Is open deification by people common in your village	38.9	60.1	1.0	0.77
		Are there too many dogs in your village	88.9	7.2	3.8	1.76
		Are dogs living in same house with people	76.0	22.6	1.4	0.48
		Do dog openly defecate in pasture	73.1	16.3	10.6	0.53
		Do you regularly treat dog with anthelmentics	25.5	24.5	50.0	0.5
		Average	60.48	26.14	13.36	0.08
		Total score				**4.05**
6	Practice on toxoplasmosis	Do many people keep cats?	63.6	29.7	6.7	0.72
		is there practice of eating raw or under cocked meat	38.0	56.3	5.8	0.75
		Do you wash and/or peel all fruits and vegetables before eating them	96.2	2.9	1.0	1.91
		Do pregnant women mind cleaning cat's house	11.5	71.3	17.2	0.57
		Is your drinking water safe for not contaminating cat excreta?	26.8	23.4	49.8	1.46
		Average	47.22	36.72	16.1	1.02
		Total score				**5.42**
7	Practice on rabies, TB,Piroplasmosis, Toxoplasmosis, and Anthrax	Have any one from your village have receive vaccine after bite of rabid dog	90.9	4.3	4.8	1.81
		Has anyone or yourself received TB treatment from the health center	38.0	56.3	5.8	1.68
		What you do when you suffer from eye infection during rainy season? (Treatments)	96.2	2.9	1.0	0.47
		Is your cooking place safe from cat and rat entering into it?	11.5	71.3	17.2	1.63
		What you do often with carcasses of cattle with black blood	26.8	23.4	49.8	1.03

		oozing out from the mouth. (Proper disposal)				
		Average	52.68	31.64	15.72	1.324
		Total score				**5.93**
8	Practice of hand washing	After cutting meat	88.5	3.4	8.2	1.75
		Between handling raw and ready to eat foods	76.9	19.7	3.4	1.52
		Before eating food	98.5	1.9	0	1.93
		After contact with farm animals.	92.8	4.8	2.4	1.85
		After visiting toilet	100	0	0	1.97
		Average	91.34	5.96	2.8	1.804
		Total score				**9.03**
9	Practice related to Japanese Encephalitis	Mosquito control	73.2	4.8	22.0	1.46
		Take Vaccines from health center	25.0	28.8	46.2	0.5
		Distancing pig houses from the residence	25.7	13.6	60.7	0.5
		Not housing the duck near paddy field	21.0	13.7	65.4	0.41
		Ask health center for laboratory test	54.6	9.8	35.6	1.07
		Average	**39.90**	**14.14**	**45.98**	**0.79**
		Total score				**3.93**
10	Practice on milk hygiene	Do you milk sick cow/buffalos	78.1	14.8	7.1	0.44
		Do you daily clean your milk can	88.9	4.3	6.7	1.76
		Do use safe drinking water to wash the udder and utensils	87.1	3.8	9.1	1.73
		Do you give hard boil to milk before consumption	86.1	7.2	6.7	1.71
		Not mixing mastitis milk with other	49.5	35.2	15.2	1.01
		Average	77.94	13.06	8.96	1.33
		Total score				**6.6**

Appendix No. 2: Referral behaviour

SN	Response Area	Knowledge score	Attitude score	Practice score	Remarks
1	Transmission of diseases from animal to human	6.7	4.6	7.73	1, Use of milk from sick animals was to 48% and respondent did not believe raw milk can transmit the diseases 2, 53% did not mind the use of livestock products from sick animals 3, Response on the disposal of dead animals relatively good , but human consumption of carcasses by 18%, feeding to dog/pig, leaving in open field and disposal in the river by almost by 26% could be the great concern to correct the behavior.
2	Transmission of diseases from birds to human	6.08	8.27	7.58	1. Around 40% did not know mode of disease transmission from birds. 2, Very good score but consumption of egg from sick bird was high to the 30%. Good result could be the reflect of Muslim cultural practice where consumption of meat from dead animal/birds is prohibited 3, Similar situation is seen on the disposal of dead birds, the worst practice is leaving at compost pit by 76%
3	Behavior on Brucella infection	3.84	5.88	6.47	1, Multiple choice made score low, but presence of disease ct strongly supported 2, Negative behavior against the disease scores 45% 3, Limited response on disposing brucella infectious materials has caused the low score, and it is treated similar to dead body disposal.
4	Behavior on cysticercosis	3.04	8.1	6.47	1, 78% not aware of cystcercosis 2, Though score remains good, 40% score came from unknown groups. 3, Score is relatively good, but 80 % do not mind feeding meat with cyst to dog/pig.
5	Teaniasis related behavior	4.90	4.61	5.99	1, 51% not aware of clinical manifestation of taeniasis 2, 28% had negative attitude and 45% were none deciding 3, open toilet use by 39%, keeping dog within human residence by 76%, open

					defecation of dog by 73% and 75 % dogs not regularly dewormed are the negative practices.
6	Toxoplasmosis related behavior	6.22	5.31	5.89	1, Awareness of clinical syndrome of toxoplasmosis was in 63% 2, Improvement in attitude behavior need by 46% 3, 38% eating under cook meat and 71% pregnant women remaining in contact with cats, seems undesirable behavior.
7	Behavior on various diseases: Rabies, TB, Leptospirosis, etc	6.19	7.63	5.93	1, Good response on Rabies, TB, Leptospirosis, but role of cat on disease transmission is not known by 56%. 2, Attitude in 23% is negative 3, Practice in preventive measures is negative in 47%
8	Behavior about Hand washing	3.52	8.82	9.03	1. Only 35% showed observed illness after consumption. 2, Negative attitude in 15% 3, very good response in 91%
9	Behavior on Japanese Encephalitis	5.67	8.56	3.93	1, 48% could recognize symptoms of JE 2, Attitude towards preventive measures was poor in by 63% 3, failure to adopt various preventive practice is by 60%
10	Behavior on milk born diseases	1.65	5.77	6.6	1, Only 17% considered diseases like TB, Anthrax, Brucellosis, Typhoid are transmitted through milk 2, Negative attitude response by 46% 3, Bad practice is on milking sick cows by 14% and use of milk from mastitis suffered cows by 50%

Appendix No. 3: Structural questions for KAP

SURVEY OBJECTIVE

One Health Asia Programme of ANSAB and RI wish to learn about your knowledge, attitudes and practices regarding diseases transmitted between animals and human (Zoonotic Disease) in order to develop awareness strategies and action plan on the prevention and control of zoonotic diseases. The information you provide will remain strictly confidential and will be used only for these purposes.

Your answers to the questions will not be released to anyone and will remain anonymous. Similarly, your name written on the questionnaire will remain confidential and will not be used for any other purposes.

Your participation is voluntary

Thank you for your assistance.

Date: ___ / ___ / ___
Baseline data collector: **Location code:**

GENERAL

1. **Name:**

2. **Place:** **District:**
   VDC/Municipality: **Village:**

3. **Distance from district center:** …… Km

4. **Sex**: (1) Male (2) Female

5. **Age (in years):**

6. **Level of education completed** (Please tick mark)

1. No education	2. Literate (No formal Education)	3. Primary School
4. High school	5. Certificate	6. Graduation
7. Post graduation		

7. **Self assessment of economical status:** (Please tick mark)

Very weak	Marginal	Adequate	Extremely good

8. **Landholding size (Ropanis /Bigha):** …….

9. **Occupation** (Please tick mark)

1. Agriculture	2. Live stock raising	3. Poultry Keeping
4. Business	5. Daily wages	6. Overseas job

7. Cast base occupation		

10. How many animals and birds you have? Give the number.

Species	No.s	Species	No.s
Cattle		Sheep	
Buffalo		Goat	
Pig		Chicken	
Duck		Dog	
Cat		Any other pet	

11. How do you raise your animals/birds in the following systems? (Please tick mark)

Species	Free range	Semi-intensive	Intensive
Cattle			
Buffalo			
Sheep			
Goat			
Chicken			

Note: Free range= No housing, Semi-intensive= Free grazing + Night Shelter; Intensive + Stall feeding

12. What you do to the animal waste? (Please tick mark)

1) Use for Gobar Gas production
2) Use for cocking
3) Use for farm yard manure production

13. Communication received on human diseases through (Please tick mark)

From training events conducted by health workers	News papers	Television
Radio—I) Local FM ii) National	Leaflet/Pamphlets distributed by health workers	NGOs

14. Communication received on animal diseases from (Please tick mark)

Training events from DLSO	News papers	Television
Radio -- i) Local FM ii)National	Leaflet/Pamphlets distributed by Livestock JT/JTA	VHW
NGOs	Others ----------	----------

15. Service used in sickness of family. (Please tick mark)

Doctor	Health Assistants	Community medical workers
Baidya (Ayurved)	Village Health Workers	Lama/ Jhankri

16. Service used for the treatment of sick animals. (Please tick mark)

Veterinary Doctor	JT/JTA (Para veterinarian	VAHW
Lama/ Jhankri	Baidya (Ayurved)	Use of local remedies

17. Where do you go for laboratory diagnosis when you fall sick? (Please tick mark)

Health Center	District Hospital	Private clinic
Reaginal Labaratory	Government referral laboratory	Private hospital

18. Drinking water is used from (Please tick mark)

Tap water	Tube well	Spring water	Deep well	River

19. Type of toilet used (Please tick mark)**:**

Open field	Flushed	Ordinary with septic tank	Ordinary with No septic tank

KNOWLEDGE

20. Do you know how animal transmit infection to human? (Please tick mark)**:**

Response	**Yes**	**No**	**Don't Know**
Drinking raw milk from sick animal			
Eating meat from sick animal			
Keeping close contact with sick animals			
From the bite of sick animals			
Food coming in contact with dung/urine of animals			

21. Do you know how birds can pass illness to human? (Please tick mark)

Response	**Yes**	**No**	**Don't Know**
Coming in contact with sick bird			
Eating dead bird			
Housing birds within human residence			
Eating egg from sick birds			
Dressing chicken bare hand			

22. In which animal you often find the occurrence the event s of (Please tick mark)

Clinical manifestation	**Cows**	**Buffalo**	**Goat**	**Sheep**	**Pig**
Abortion					
Infertility					
Retention of placenta					
Stillbirth					
Weak fetus					

23. Have you seen numerous small cysts in the muscle of slaughtered these animals?
(Please tick mark)

Species	**Yes**	**No**	**Don't Know**
Buffaloes			
Goat			
Sheep			
Pig			

Proglotis in human stool			

24. Have you seen following sign in animals and people in your village? (Please tick mark)

Response	Yes	No	Don't Know
Gid in sheep and goat?			
larger solid type of cyst in the liver, lung and muscles Small cyst in the muscles of meat animals			
Epilepsy in human			
More larger solid type of cyst in the liver of the animals of dog keeping households			
People receiving surgical treatment			

25. Please give your response to following questions. (Please tick mark)

Response	Yes	No	Don't Know
1.Have you suffered from eye disease with symptoms of Red eye, pain, sensitivity to light (photophobia), tearing of the eyes , blurred vision and self recovery within a month			
2.How common is abortion in sheep and goat			
3. How common is miscarriage, a stillborn child and child born with red eyes in the villages?			
4. Do you know cats can transmit diseases to people?			
5.Do you know soil are full of germs to cause diseases			

26. Do your children suffer often after eating egg/meat/milk with following sign?
(Please tick mark)

Sign	Yes	No	Don't Know
Stomach Pain			
Dirrhoea			
Vomition			
Fever			
Head ach			

27. Please give your response to following questions. (Please tick mark)

Response	Yes	No	Don't Know
1.How often you find rabid dog in the villages			
2.Have any one suffer from TB in the village			
3.Have you notice people falling sick showing symptoms of fever,frequent urination, skin rash, stiff neck abdominal discomfort ,red conjunctiva and jaundice during rainy season			
4.Do you know cats and rats can cause diseases in human			
5.Have any seen buffaloes dyeing with black blood coming from mouth and anus after death			

28. Have you seen people suffering from sign of (Please Tick mark)

Symptoms	Yes	No	Don't Know
Onset of high fever			
Stiff neck and headache			
seizures (fits)			
Inability to speak			
Paralysis)			

29. Which of the diseases could be passing to human from the milk consumed? (Please tick mark)

Diseases	Yes	No	Don't Know
TB (Kshaya Rog)			
Anthrax (Patke)			
Brucellosis (KuJe)			
Typhoid/Paratyphoid (Myadhi jaro).			
Tineasis (Chepto Juga)			

ATTITUDE

30. Do you mind using the following product from sick /dead animals? (Please tick mark)

Livestock product	Yes	No	Don't Know
Meat			
Milk			
Offal			
Hide/skin			
Wool			

31. Do you mind eating following from sick or dead birds? (Please tick mark)

Response	Yes	No	Don't Know
Meat			
Eggs			
Excreta contaminated food			
Excreta contaminated drinking water			
Chicken offal			

32. Will you mind doing following deeds? (Please tick mark)

Response	Yes	No	Don't Know
Drinking milk from regular aborting cows			
Handling bare hand the placenta and foetal fluid from aborted animal			
Bare hand dressing the carcasses of aborting animals			
Reporting aborted cases to DLSO for laboratory test			
Not selling milk to consumption			

33. Will you allow for (Please tick mark)

Responses	Yes	No	Don't Know

Drinking water contaminated with pig faeces			
Putting fingers in your mouth while handling pig			
Allowing pig to eat human excreta or feed contaminated with it			
Eating raw buffalo meat			
Use of human 'night soil' in vegetable production			

34. Please give your response to following questions. (Please tick mark)

Response	Yes	No	Don't Know
Meat with hydratid Cyst can be eaten			
Feaces of dog should not contaminate pasture of grazing animals			
Do you believe dog transfer tape worm infection to man and other animals?			
Will you allow dog to eat meat with cyst?			
There is no harm keeping dogs together with animals			

35. Do you mind doing for (Please tick mark)

Response	Yes	No	Don't Know
Keeping cat with sheep and goat			
Not washing hand with soap after touching animals and birds			
Eating raw vegetable grown where cat faces are in abundance			
Do you mind eating meat from regularly aborting sheep/goat?			
Do you mind eating undercooked meat of animals			

36. Do you mind doing for (Please tick mark)

Response	Yes	No	Don't Know
Touching rabid dog			
Can flood water cause infectious diseases c to animals and human?			
Do you mind bathing in a water contaminated with urine of animals			
Could you eat cat and rat touched food			
Could you eat meat from animals dying with black blood oozing from mouth and anus			

37. Do you mind eating food contaminated with (Please tick mark)

Type of food	Yes	No	Don't Know
Contaminated food, often having no unusual look or smell;			
Fresh blood contaminated food			
Food placed on unwashed plate that is used to held raw meat, pork, chicken and fish.			
Eating raw or uncooked meat			
Drinking contaminated water with animal dung and urine			

38. Could you do following deeds? (Please tick mark)

Deeds	Yes	No	Don't Know
Keeping pig near the residence in mosquito prevailing area			
Housing ducks close to home			

Housing ducks close to paddy field			
Eating pork from the endemic area			
Weeding and draining open stagnant water and pig houses			

39. Do you mind? (Please tick mark)

Activities	Yes	No	Don't Know
Drinking milk without boiling			
Drinking milk from sick cow			
Milking cows/buffalo while you are not well			
Drinking self coagulated milk			
Drinking milk from mastitis suffered cow			

PRACTICE

40. What you do with carcasses of dead animals? (Please tick mark)

Response	Yes	No	Don't Know
Use for human consumption			
Feed to dogs/pig			
Burry in the soil			
Leave to vulture to feed			
Throw in the river			

41. What you do with carcasses of dead Birds? (Please tick mark)

Response	Yes	No	Don't Know
Dress and eat meat			
Feed to dogs/pigs			
Throw in the compost pit			
Throw in the river			
Burry in the soil			

42. What do you do to aborted foetus /placenta? (Please tick mark)

Activities	Yes	No	Don't Know
Feed to dog and cat			
Leave at open field			
Burry in the soil			
Throw in the river			
Leave at Compost pit			

43. What you do when your slaughtered animals show numerous small cysts in the muscle/liver/brain? (Please tick mark)

Activities	Yes	No	Don't Know
Remove the cyst and eat meat			
Throw away infected organs or part of it			
Condemn the whole carcasses			
Feed the infected organ to dog or pig			
Eat only after properly cooking			

44. Please response to following questions. (Please tick mark)

Activities	Yes	No	Don't Know
Is open deification by people common in your village			
Are there too many dogs in your village			
Are dogs living in same house with people			
Do dog openly defecate in pasture			
Do you regularly treat dog with anthelmentics			

45. Please give your response to following questions. (Please tick mark)

Activities	Yes	No	Don't Know
Do many people keep cats?			
is there practice of eating raw or under cocked meat			
Do you wash and/or peel all fruits and vegetables before eating them			
Do pregnant women mind cleaning cat's house			
Is your drinking water safe for not contaminating cat excreta?			

46. Please give your response to following questions. (Please tick mark)

Activities	Yes	No	Don't Know
Have any one from your village have receive vaccine after bite of rabid dog			
Has anyone or yourself received TB treatment from the health center			
What you do when you suffer from eye infection during rainy season? (Treatment)			
Is your cooking place safe from cat and rat entering into it?			
What you do often with carcasses of cattle with black blood oozing out from the mouth. (Proper disposal)			

47. Do you wash your hands? (Please tick mark)

Activities	Yes	No	Don't Know
After cutting meat			
Between handling raw and ready to eat foods			
Before eating food			
After contact with farm animals.			
After visiting toilet			

48. At the time of JE outbreak, what will you do? (Please tick mark)

Activities	Yes	No	Don't Know
Mosquito control			
Take Vaccines from health center			
Distancing pig houses from the residence			
Not housing the duck near paddy field			
Ask health center for laboratory test			

49. Please response on your milking practice. (Please tick mark)

Activities	Yes	No	Don't Know
Do you milk sick cow/buffalos			
Do you daily clean your milk can			
Do use safe drinking water to wash the udder and utensils			
Do you give hard boil to milk before consumption			
Not mixing mastitis mik with other			

Appendix No. 4: Question for butchers

SN	Questions	Response
1	Do you know meat can spread infectious disease to human?	1. Yes 2. No
2	If yes , give the name of 3 diseases	1. 2. 3.
3	How do you slaughter buffaloes for meat	1. Jhatka 2. Hala hal 3. Stunning
4	Do you slaughter sick animals for sale of meat:	1. Yes 2. No
5	Name the equipments that you have been using for slaughter and dressing?	1. 2. 3. 4. 5.
6	Do you clean and sterilize the equipments after dressing the meat	1. Yes 2. No
7	Do you wash and sterilize "Achano" meat board	1. Yes 2. No
8	What type of water you use for skinning the carcasses and dressing?	1. Drinking water 2. River water 3. Pond water 4. Any water
9	Do you use Apron and glove to avoid contact with meat while dressing	1. Yes 2. No
10	Where do you sale meat after dressing the carcasses:	1. Open places 2. Fly proof meat shop
11	Do you allow carcasses to contact soil?	1. Yes 2. No
	What you do to the organs of carcasses when they have cyst (Pani Phoka) and Large hard cyst in liver	1. Remove the cyst and eat meat 2. Throw away infected organs or part of it 3. Feed the infected organ to dog or pig 4.
12	How long you keep meat in open places	1. Whole day till all are not sold 2. Few hours
13	Do you use refrigerators for storing meat	1. Yes 2. No
14	Where do you dispose off ingest, offal and carcasses washed water :	1. In the pit 2. Sewage drainage 3. Leave on waste land

Appendix No. 5: Response output data (Electronic copy, submitted)

Appendix No. 6: Primary response data (Electronic copy submitted)

Appendix No. 7: Persons consulted

CENTRAL

1. Dr. Gita Shakya, Director, NPHL
2. Dr. V.C. Jha, Programme Director, Directorate of Animal Health
3. Dr. Kisan Chand Thakuri, Incharge, Veterinary Epidemiology Center
4. Dr. Barun Sharma, Veterinary Epidemiologt Center, (Scholar selected for Master degree, Massy University)
5. Dr. Bodh Nath Adhikari, Senior Veterinary Officer, Veterinary Public Health Office, Tirpureshwor
6. Dr. Mukul Upadhya, Veterinary Officer, Veterinary Public Health Office, Tirpureshwor
7. Dr. Narayan Ghimire. Nepal Veterinary Council, Tirpureshwor

CHITWAN

1. Mohanraj Pandey,
2. Dr. Keshabraj Bhurtel, Medical Superintendent
3. Suryamani Kandel, Account Officer
4. Hari Bahadur Thapa, Lab Incharge
5. Bhagirath Timilsina, Chairman, Annapurna Dairy Cooperative at Gitanagar, Chitwan
6. Sitaram Marahatta, In- charge, Veterinary Service Center, Gitanagar
7. Jhabindra Banjade, In- charge, Veterinary Service Center, Madi, Chitwan
8. Tekmani Mahato, Health Assistant, Baghauda Hospital, Madi, Chitwan
9. Somlal Mahato, Lab. Technician, Baghauda, Hospital
10. Iswari Prasad Acharya, In-charge, Veterinary Service Center, Jagatpur, Chitwan
11. Mahendra Bastola (JTA) , Veterinary Service Center, Jagatpur, Chitwan
12. Badri Prasad Khakure, In-charge Health Post, Meghauli, Chitwan
13. Laxmi Bhusal, Health Assistant
14. Nagindra Misra, In-charge, Veterinary Sub-Center, Megahuli
15. Dr. Ram Kumar Karki, DLSO, Chitwan
16. Krishnagopal Sibakoti ,Technical section in-charge, DLSO Chitwan
17. Chhatra Bahadur Kumal, JTA, DLSO, Chitwan
18. Dr. Sanjiv Pandit, Himalayan Association Research Trust (HART), Chitwan
19. Chandra Rai, Admin Officer HART,
20. Sarita Dhakal, Lab Technician, Pathology Lab (Private, Bharatpur)
21. Balaram Luitel, Information Officer, DDC, Chitwan
22. Dr. Purushottam Tripathi, In-charge, National Avian Laboratory, Bharatpur, Chitwan
23. Dr. Vijay Kumar Shrestha, VO, National Avian Laboratory, Bharatpur, Chitwan

BUTWAL

24. Kamana Acharya at ANSAB Office, Butwal
25. Dr. Gandhiraj, Upadhyay, DLSO, Rupandehi
26. Dr. Rup Narayan Shrestha, Veterinary Officer
27. Dr. Pradip Sharma, Livestock Development Officer
28. Tikaram Adhikari, In-Charge, TB and Leprosy Control Programme, DPHO, Rupandehi
29. Om Prakash Panthi, In-Charge, JE Control Programme, DPHO, Rupandehi

30. Om Prakash Gupta- Statistician, DPHO, Rupandehi
31. Toplal Sharma, Information Officer, DDC, Rupandehi
32. Ramnaresh Yadav Adarsha Higher Secondary School at Dhakdhai, Rupandehi
33. Livestock Service Center (LSC) at Dhakdhai, Rupandehi
34. Krishna Prasad Pandey, Science Teacher, Secondary School at Dhakdhai
35. Ram Gopal Yadav, Science Teacher, Secondary School at Dhakdhai "
36. Ram Suresh Barma, English Teacher, Secondary School at Dhakdhai
37. Ram Niwash Chaudhary- Office Assistant, Secondary School at Dhakdhai
38. Dr. Patal Giri, Public Health Officer, Dhakdhahi Primary Health Center
39. Liladhar Ghimire, Health Assistant, Dhakdhahi Primary Health Center
40. Khemraj Pokhrel, Dhakdhahi Primary Health Center
41. Om Prakash Thakur, In- Charge, Livestock Center, Majhgaun, Rupandehi
42. Rameswor Dhakal, Health Assistant, Health Post, Majhgaun
43. Mahmood Murtaja, In- Charge of LSC, Sungai Gaun; Lumbini Cultural Municipality
44. Somnath Sharma , Health Assistant, Health Post, Lumbini Cultural Municipality
45. LSC, Manpakadi

Banke

46. Dr. Tek Nath Acharya, DLSO, Nepalgunj
47. Jau bahadur Karki, JT, Dhakeri, Veterinary Service Center
48. Ujjal Man Gharti, Health Assistant, Dhakeri Health Post
49. K.B.Kuwanr, Kohalpur, Veterinary Service Center
50. Komal Acharya, Sitapur, Veterinary Center,
51. Asok Pandey. Betahani, Veterinary Service Center
52. Dumri Raj Sharma, Health Assistant, Betahani Sub Health Post
53. Gopi Chandra Burma, High School Teacher, Pasupati, Higher Secondary School
54. Dr Jitendra Mahaseth, Nepalgunj Medical College,
55. Dr. Subash Pandey , Nepalgunj Medical College
56. Dr. Arikal Sakla , Nepalgunj Medical College
57. Dr Anil Kumar Roy, Nepalgunj Medical College
58. Dr. Ram Bahadur Malla, Nepalgunj Medical College
59. Nagendra Prasad Chaudhary, Senior Public Health Officer , 9858024358
60. Man Bahadur Oli, statistician, 9858020008
61. Krishna Prasad Subedi, Vice Chairman, Meat Producer's Association, 9858025778
62. Mr. Basanta Shrestha, 9848035853
63. Bharat Kumar Mahatao, Chairman, Nepalgunj, Meat Producer's Association 9858029766
64. Dipendra Kumar Joshi, Chairman, Nepalgunj, Pig production Association, 9849016786
65. Ram Lal Mahatao, Poultry producers Association, 9855092998.
66. Bikash Singh Meat , Chairman, Meat Poducer's Association, Nepal gunj,9898021782
67. Ram Kumar Chauhan, Western Poultry, Chisapani, 9858029013
68. Dillip Kumar Sonkar, D.K. Meat products, 9858021095
69. Puran Bahadur Soni, D. K. Products, Nepalgunj, 9851187098