Research Study: To define and analyse cross-border and in-country livestock and livestock-products market systems in India for control of Transboundary Animal Diseases

Final report, December'2013

Defining and analyzing the market systems in the context of identifying the disease risk and to assist in stakeholder engagement for risk mitigation in a targeted manner is critical to achieve the goal of disease control.

Focusing on select areas of 5 Indian states of Indo-Gangetic plain region bordering Nepal, Bangladesh and Bhutan, this report highlights learning on livestock market system (physical markets and value chain). It also recommends suggestions to support India's on-going initiative for control of transboundary animal diseases like Foot and Mouth disease, Peste Des Petits Ruminants, Classical swine fever etc.

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Abbreviations and acronyms

ASCAD	ASSISTANCE TO STATES FOR CONTROL OF ANIMAL DISEASE
BOP	BORDER OUT POST
BSF	BORDER SECURITY FORCE
CSF	CLASSICAL SWINE FEVER
DAHD	DEPARTMENT OF ANIMAL HUSBANDRY AND DAIRY
DGFT	DIRECTOR GENERAL OF FOREIGN TRADE
ECTAD	EMERGENCY CENTRE FOR TRANSBOUNDARY ANIMAL DISEASES
FGD	FOCUS GROUP DISCUSSION
FMD	FOOT AND MOUTH DISEASE
FMD-CP	FOOT AND MOUTH DISEASE –CONTROL PROGRAMME
GF-TAD	GLOBAL FRAMEWORK FOR THE PROGRESSIVE CONTROL OF TRANSBOUNDARY ANIMAL DISEASES
GIS	GEOGRAPHICAL INFORMATION SYSTEM
HPED	HIGHLY PATHOGENIC EMERGING AND RE-EMERGING DISEASES
ICAR	INDIAN COUNCIL OF AGRICULTURAL RESEARCH
KII	KEY INFORMANT INTERVIEW
LCS	LAND CUSTOM STATION
NADRS	NATIONAL ANIMAL DISEASE REPORTING SYSTEM
NADRES	NATIONAL ANIMAL DISEASE REFERRAL EXPERT SYSTEM
NH	NATIONAL HIGHWAY
PD_ADMAS	PROJECT DIRECTORATE ON ANIMAL DISEASE MONITORING AND SURVEILLANCE
PPR	PESTE DES PETITS RUMINANTS
RSU	REGIONAL SUPPORT UNIT
SAARC	SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION
UP	UTTAR PRADESH

1USD = INR 55

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We are grateful to Dr.H.Rahman, Director PD_ADMAS, ICAR and a number of government officials and field functionaries in each of the study areas for their cooperation in organizing consultations, fine tuning of research design, data collection and validation of findings.

The report draws heavily on opinions, suggestions, and the collective wisdom of Vet Helpline India team chosen for the study.

A number of persons from the private sector provided lead information and networking support in all the study areas.

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Executive Summary:

The impact of Transboundary Animal Diseases (TADs) like FMD, PPR and CSF often transcends national boundaries, and can be the cause of national emergencies. Defining and analysing the market systems in the context of identifying the disease risk and to assist in stakeholder engagement for risk mitigation in a targeted manner is critical to achieve the goal of disease control.

The high-level regional consultation organized during 2011 under the auspices European Union funded programme: *Regional cooperation programme on highly pathogenic and emerging diseases (HPED) in South Asia (SAARC component) and in the ASEAN countries* recognized the importance of the study of the market system and recommended that the programme should promote SAARC member countries to map livestock production system and improve understanding of markets, value chains and animal movement patterns in the sub-region.

A short study from July to December 2013, aimed broadly at understanding livestock market system (value chain and physical markets) was undertaken by Vet Helpline India Pvt Ltd as a follow up of the above recommendation. It was conducted under the overall supervision of FAO hosted Regional Support Unit (RSU) of the program for SAARC countries located at Kathmandu, Nepal. The study covered 5 Indian states of Indo-Gangetic plain region and eastern India bordering Nepal, Bangladesh and Bhutan viz. Uttar Pradesh, Bihar, West Bengal, Assam and Tripura.

Following designed research methodology and developed guides, the study identified 45 risky administrative divisions in border areas and 27 risky in-country livestock markets across five study states. Screenshots from *google maps* were prepared to show cross-border and in-country livestock movement routes with possible location within in-country corridor for setting up of check post to monitor animal movement. Data pertaining to livestock markets, and police actions on illegal cattle trade were analysed to show concentration of markets, animal movement trend, seasonal variation etc. Considering study limitations, porous border and recorded *modus operandi* of illegal trade, estimation of volume of cross-border illegal trade was restricted to estimation of animal traffic in 5 identified locations within two prominent movement corridors only. The five locations together indicated peak hour movement of 9300 animals per week.

Based on analysis of data and following chain delimitation in the context of TAD risk, value chain diagrams for large and small animal meat sector were prepared. Detail of various types of people, activities, chain governance, motivations of value chain players and learning from livestock market visit reports were discussed in detail, essentially identifying disease risk hotspots.

Based on the learning, the study elaborated on 5 key actions points' viz. Sensitization on existing laws, constitution of task force for animal transport policy and movement control, capacity building of value chain players, focussed surveillance, vaccination and interventions targeted at physical livestock markets such as GIS mapping and premises registration.

Introduction:

The impact of Transboundary Animal Diseases (TADs)[1], often transcends national boundaries, and can be the cause of national emergencies. Research indicates that 75 percent of infectious agents known to be emerging in human populations are deemed zoonotic. TADs are also very important for food security, sustained economic development and trade. It is imperative therefore, wherever possible, to limit the socio-economic disruptions resulting from outbreaks of TADs. The scientific community worldwide has recognized the need for inter-sectoral, integrated interventions essentially targeting human – animal –ecosystem interface issues (One Health approach) to control all Highly Pathogenic Emerging and re-emerging diseases (HPED). Large investments are being made in targeted regions under facilitating mechanism like Global Framework for the Progressive control of Transboundary Animal Diseases (GF-TADs).

There are strong social and economic rationale for public intervention and cross-border collaboration for collective action against TADs. It has been a challenge to develop and implement cost effective actions within a comprehensive framework for control of TADs. In India, the technical ability to control animal diseases has greatly advanced in recent years. The country has harnessed the technological advances and of late launched National Animal Disease Reporting System (NADRS) and web based GIS platform (National Animal Disease Referral Expert System –NADRES) to support surveillance and control of livestock diseases. The DAHD, GOI is supporting various national institutions (e.g. Animal Quarantine and Certification Services, National Veterinary Biological Products Quality Control Center, Central and Regional Disease Diagnostic Laboratories) and state governments for livestock health and disease control. Amongst the various central sector schemes, funds earmarked for five central schemes are being directly used for control of TADs in India. These are Assistance to States for Control of Animal Diseases (ASCAD), Foot and Mouth disease Control Programme (FMD-CP), National Control Programme of PPR, National Project on Rinderpest Eradication, National Brucellosis Control Programme and National Animal Disease Reporting System. The improved information exchange has facilitated reaction to TADs with greater regional cooperation amongst SAARC countries. It is to be noted that the SAARC adopted GF-TADs during the year 2005.

[1] Epidemic diseases which are highly contagious or transmissible and have the potential for very rapid spread, irrespective of national borders, causing serious socio economic and possibly public health consequences.

South Asia in general and India in particular are incurring huge losses mostly from two important transboundary animal diseases viz. foot and mouth disease (FMD) and peste des petits ruminants (PPR). Classical Swine Fever can also be considered as a disease of transboundary importance in the context of North East India.

Beyond apparent causes, a complex interplay of environmental factors is known to be behind spread of animal diseases. Networks and linkages in livestock value chains that link production systems, markets and consumers constitute a contact network, which provides opportunities for the transmission of contagious diseases within and between sectors (FAO, 2012). A number of factors can be considered as risk indicators for transboundary transmission of diseases. Possible risk indicators that can be linked to market systems include presence of movement corridor for livestock and livestock products, presence of livestock markets, permanent and temporal driving forces for cross border trade etc.

Livestock sectors are constantly evolving in order to meet the changing needs of a globalized society. There is a surge in border trade. These processes are bringing new and changing disease risk. Defining and analyzing the market systems more particularly the value chain in the context of identifying the disease risk and to assist in stakeholder engagement (national and international) for risk mitigation in a targeted manner is critical to achieve the goal of disease control.

Since 2009, the Food and Agriculture Organization of the United Nation (FAO) has been implementing a European Union funded programme: *Regional cooperation programme on highly pathogenic and emerging diseases (HPED) in South Asia (SAARC component) and in the ASEAN countries*. Under the programme FAO hosted the Regional Support Unit (RSU) for SAARC at Kathmandu, Nepal during June 2010, primarily to prepare the path to a fully functional Regional Coordination Mechanism (RCM) of member countries to address the concern on HPED. The high-level regional consultation on the control of priority transboundary animal and other emerging infectious diseases in South Asia held at Bangkok, Thailand from 13-14 January 2011 under the auspices of the programme recognized the importance of the study of the market system and recommended that the RSU through Regional Epidemiological Centre (REC) should promote SAARC member countries to map livestock production system and improve understanding of markets, value chains and animal movement patterns in the sub-region. The present study being implemented by Vet Helpline India Pvt Ltd. (Reference: letters of agreement with FAO-India under the overall all supervision of RSU) is a follow up of this recommendation to assist TADs control in India and the region. Similar studies are also being conducted for Bangladesh and Nepal.

The Research question:

A review of literatures indicates that, understanding of livestock market system requires a detailed study of operation of physical livestock markets, people in the business, their activities, movement of live animal / livestock products / farm inputs and delivery of related services (support system). It also requires analysis of relationships and assessing the motivation behind various decisions and actions / practices people take recourse to at various levels e.g. from production to consumption (Farm to Fork).

In the era of globalization, a livestock market system can be broadly classified in to 'in country (domestic)' and cross border (import-export) market systems.

Countries world-wide that are adopting risk based, people centred strategies for control of animal diseases is increasingly focusing on dynamic documentation of their livestock market systems. Understanding of cross-border market system assumes more importance in the control of TADs. The outcome expected from such documentation is primarily the reduced cost of disease control intervention and effective risk communication for voluntary compliance of law by various market actors and stakeholders.

Very limited published reports are available on previous studies in India to understand livestock market systems in the context of animal diseases control.

Focusing on control of TADs and as such cross-border market systems, the present study attempts at getting answers to following primary and secondary research questions. Considering dynamic nature of any market system, an attempt is also being made to develop tools that can help government agencies in India to continuously collect livestock market system data for planned disease control intervention.

Primary question:

1. Where and what (behaviour) should we target for participatory disease control?
2. What is a representative sample of the people in livestock / livestock product production to consumption chain whom we can involve and seek help in controlling the spread of diseases?

3. What factors should we consider to best design and implement TADs risk communication action plan?
4. How important is cross-border livestock trade in terms of volume (Unit / Rupee value)?
5. What are the drivers for movement of animals and cross-border trade?

Secondary questions:

1. What are the disease risk hotspots (in socio-economic perspective e.g. trade hub, livestock market, transport corridors, production clusters, cross border points etc.) covering production, market, husbandry, processing, transport and trading activities related to livestock and livestock products?
2. What are the characteristic of livestock production, marketing and transport system (including international trade)?
3. Who are the players involved in livestock / livestock product production to consumption related chain of activities? How are they related and who or what governs these relationships?
4. What are the key issues affecting people and how does the information, services, trade linked to livestock and diseases flows amongst the various stakeholders?
5. What are the key animal health issues?
6. How do people perceive disease risk? What motivates risky activities and behaviours on their part?
7. What resource gap exists in the context of implementation of bio-security in production and trade?
8. What are the prominent cross-border livestock movement corridors and trade routes with estimated volume?
9. What is the estimated cross-border trade volume (recorded and un-recorded) of livestock and livestock products? What factors are responsible for disparity between recorded and un-recorded trade?
10. What are the gap in infrastructure, institutions, investments, innovation and incentive mechanism needed to ensure safe international trade in livestock and livestock products?

Consultations:

Regional inception workshop:

The Regional Support Unit (RSU) for SAARC, located within the FAO Sub-regional Emergency Centre for Transboundary Animal Diseases (ECTAD) based in Kathmandu, Nepal facilitated a regional workshop in Kathmandu, Nepal from 30th April to 1st May'2013 primarily to:

1. Harmonize the approach to analysing cross-border and domestic value chains
2. To prioritize the required epidemiological and value chain data
3. To identify data sources and study sites
4. To identify the required data collection and data analysis techniques.

The workshop was attended by representative of three contracting firms from each of countries viz. Bangladesh, India and Nepal, that were undertaking the study in their respective countries. Experts from RSU-ECTAD and FAO-Bangkok facilitated the discussion on methodology proposed by respective contracting firms. A full session of the workshop was devoted primarily to identify study areas based on experience and to develop sample research instruments to be used by contracting firms as a guide.

The Indo-Gangetic plains of India bordering countries of Nepal, Bhutan and Bangladesh are known zone for TADs.

Map 1 Ganges Plain area

Eco-pathozone maps for transboundary diseases like FMD, PPR and CSF prepared by National Animal Disease Referral System (NADRES), ICAR indicate the Indo-Gangetic plains and eastern states of India as important area in terms of TADs risk. During the meeting a thorough discussion was made on feasibility of covering all the 8 Indian states of Indo-Gangetic plain and eastern region bordering Nepal, Bangladesh and Bhutan viz. Uttarakhand, UP, Bihar, West Bengal, Assam, Tripura, Meghalaya, Mizoram.

Based on expert opinion, the meeting decided to focus on border areas of five Indian states viz. UP, Bihar, West Bengal, Assam and Tripura. The map study conducted focusing on land custom station during the regional inception meeting indicated the following as suggestive study area in the context of India, Nepal and Bangladesh.

<table>
<tr><th colspan="5">Suggestive Study area based on expert opinion</th></tr>
<tr><th colspan="3">India</th><th colspan="2">Nepal</th></tr>
<tr><th>State</th><th>District</th><th>Place</th><th>State/District</th><th>Place</th></tr>
<tr><td rowspan="3">Uttar Pradesh</td><td rowspan="2">Bahraich</td><td>Katarniaghat</td><td rowspan="2">Banke</td><td rowspan="2">Nepalganj</td></tr>
<tr><td>Nepalganj</td></tr>
<tr><td rowspan="2">Maharajganj</td><td>Nautanwa – Sonauli</td><td>Kapilvastu</td><td>Krishnanagar</td></tr>
<tr><td></td><td>Rupandehi</td><td>Bhairahwa</td></tr>
<tr><td rowspan="6">Bihar</td><td rowspan="2">Purba Champaran</td><td rowspan="2">Raxaul & Motihari</td><td>Parsa</td><td>Birganj</td></tr>
<tr><td>Bara</td><td>Jitpur</td></tr>
<tr><td rowspan="2">Sitamahi</td><td>Sitamahi</td><td rowspan="2">Dhanusa</td><td rowspan="2">Janakpuri</td></tr>
<tr><td>Jayanagar</td></tr>
<tr><td>Araria</td><td>Jogbani</td><td rowspan="2">Morang</td><td rowspan="2">Biratnagar</td></tr>
<tr><td>Kishanganj</td><td>Kishanganj</td></tr>
<tr><td>West Bengal</td><td>Darjeeling</td><td>Naxalbari</td><td>Jhapa</td><td>Kakarvitta</td></tr>
</table>

Suggestive study area based on expert opinion				
India			Bangladesh	
State	District	Place	State/District	Place
Assam	Karimganj	Sutarkandi	Sylhet	Zakiganj
	Dhubri	Dhubri	Kurigram	Bhurungamari
West Bengal	Jalpaiguri	Phulbari	Lalmonirhat	Burimari
	Malda	Mehedipur	Chapai Nawabganj	Sona Masjid
	North 24 Paraganas	Petrapol	Jessore	Benapole
	South Dinajpur	Hilli	Dinajpur	Hilli
Tripura	South Tripura	Belonia	Feni	Chagalnaiya

Country inception workshop:

Following the signing of the contract on 13th May'2013, Vet Helpline India organized an India inception meeting on 8th June'2013 at Guwahati, India. Representative of FAO-India, Dr.A.B.Negi attended the meeting as observer.

The prime objective of the meeting was to inform and engage various stakeholders. Dr.H.Rahman, Director, Project Directorate on Animal Disease Monitoring and Surveillance (PD_ADMAS) of Indian Council of Agricultural Research (ICAR), Government of India attended the meeting as the Chief Guest. The respective director(s) of Animal Husbandry and Veterinary department of Indian States viz. Uttar Pradesh, West Bengal and Tripura attended the meeting as guests of honour. Other stakeholders who attended the meeting include representatives of academia, government disease control laboratories, custom and excise departments etc.

Picture 1 List of participants of India inception meeting 8th June'2013

The participants discussed the methodology and available secondary information on government policies, programmes and on-going disease control initiatives. Maps were consulted to identify prominent livestock markets and possible areas of cross-border animal movement in study states viz. Assam, Bihar, Tripura, UP and West Bengal.

Picture 2 Glimpse of Map study during India inception meeting

The discussion provided valuable inputs to fine tune the study approach, methodology and work-plan. For example, selection of study areas based entirely on land custom station as identified during regional inception workshop was found to be inappropriate in the context of India. Similarly, the proposed methodology of estimation of trade volume based on stratified sampling (on the basis of traffic) of Land Custom Station (LCS) and standardization of data pertaining to trade (to be collected from sampled custom stations) had to be dropped as no trade of live animal is allowed through land custom stations in India.

Reviewing the secondary information on cross-border trade statistics collected from the website of Director General of Foreign Trade (DGFT), the meeting suggested for more information to be collected particularly on methodology adopted in preparing such statistics.

As far as the study area is concerned the meeting suggested inclusion of bordering areas of North East India with Myanmar as there are credible secondary information on movement of pigs from Myanmar to India.

The meeting also helped in the orientation of field of the team of Vet Helpline India as they could exchange views regarding ground realities with visiting Directors of Animals Husbandry and Veterinary of States viz. UP, West Bengal and Tripura.

Interaction with scientist at PD_ADMAS, Bangalore:

An interactive programme on the proposed study was organized at the auditorium of Project Directorate on Animal Disease Monitoring and Surveillance (PD_ADMAS), ICAR, Government of India (located at Hebbal, Bangalore, India) on 7th July'2013. The objective of the programme was:

- To inform the scientists at PD_ADMAS about the project and to record their guidance and expectations.
- To exchange views with the scientists on challenges in control of TADs in India and policy imperative thereof.
- To understand GIS facility at the directorate and the works pertaining to development of IT based disease monitoring system.

The Director, PD_ADMAS and a number of scientists and research scholars attended the presentation and participated in the discussion that followed. The participants appreciated the study approach and methodology in general but suggested possible improvement in area sampling strategy as experience of expert alone to select study location may not be a prudent approach for a big geographical area of Indo-Gangetic plains which the study intends to cover.

The scientists at PD_ADMAS highlighted the need of continuous capacity building; enhance man-power at field level and more practical approach to ensure regular reporting from field. Participating on the discussion on TADs disease profile of identified key districts of cross-border livestock movement importance, they informed that the current reported data on disease outbreak from States is inadequate and may not be used for sampling of areas for the

current study. The participating scientists also highlighted that not much GIS based information is available on animal movement pathways in India.

Discussing on the outcome of the proposed study, the participants stressed that the study would help considerably in developing tools for focused surveillance of TADs. It would also help in targeted risk communication and engagement / resource sharing with private sector stakeholders.

Validated study objective and methodology:

Based on the research questions, stakeholder consultation and review of available resources, the following objectives, output/ outcome and methodology were finalized:

Objective:

a) To record the different sub-systems in the livestock market system e.g. markets and associated value chains

b) To qualitatively and quantitatively analyse the structure and performance of select value chains in the context of TADs disease risk.

c) To identify cross border routes, movement corridors vis-à-vis trade volume, risk hotspots / control points along the value chain.

d) To consult with key stakeholders on potential value chain upgrading options in the context of better control of TADs.

Outputs and Outcome:

The study envisaged the following deliverables:

- Inception cum medium term report highlighting details of stakeholder engagement, tested methodology, focused study areas, piloted instruments and preliminary report based on initial findings.
- Draft study report with value chain diagram and critical control points for TADs control for stakeholder validation.
- Maps showing cross-border livestock movements and routes in study areas.
- Recommendation for value chain up-gradation in the context of TADs.

In the context of risk based, people centred control of animal diseases, market system or value chain analysis can provide a practical framework. It can help in identifying key constraints (such as ability to pay etc.) and opportunities (such as new markets etc.) including the probability of disease transmission, likely socio–economic impact of risk reduction

measures and the stakeholders who need to be involved or communicated with in order for an intervention to succeed.

The targeted outcome of the study is collaborative people-centred risk management strategy and risk communication initiatives.

The research methodology:

The research was conducted in two distinct phases. The phase –I focused on stakeholder engagement, preliminary identification of study areas, movement routes and value chain delimitation, whereas Phase –II focused on actual data collection on market systems, analysis of data, validation and presentation. Activities of phase-I continued till the end of the data collection in Phase-II in order to accommodate new insights on importance of particular border area or a livestock movement route(s).

The detailed validated research methodology adopted for the study included:

1. Review of secondary data[2] on livestock production and trade system in identified areas.
2. Development of various research guides and instruments following an expert consultative process and pre-testing of same.
3. Exploratory situational analysis[3] for criterion based selection of study areas, in-country markets and animal movement routes.
4. Delimitation of livestock value chain.
5. Team building for field data collection in respective states and their orientation.
6. Pilot testing and finalization of guides and instruments.
7. Data collection.
8. Analysis and report preparation.
9. Stakeholder validation in target areas.
10. Presentation of findings.

[2] National government, international agency and industry publications, previous and ongoing research on VCA, route maps, and statistics on production clusters, disease event reports, surveillance statistics etc.

[3] A qualitative assessment based on travel to trade hub in state capital, land custom stations, prominent livestock markets, interaction with officials / veterinarians, key informant interview with traders / farmers etc.

Research Tools

To assist in systematic secondary data collection a secondary data collection guide was prepared (Annexure –I).

To assist in identifying various traded livestock and livestock linked products a guide containing list of such products based on harmonized system code (up to 4 digits) was prepared (Annexure-II).

To assist in field qualitative data collection using participatory methods like Focus Group Discussions (FGD) and Key Informant Interviews (KII), a detailed guide was prepared for use by the field team (Annexure-III). The field teams were trained to internalize the guide and to adopt innovative means to engage respondents.

In the context of the study a focus group was defined as a group of minimum 5 individuals belonging to same or multiple stakeholder groups in the context of livestock value chain (Farm to Fork). They can be from different social strata / caste / religion. They may or may not be related to each other or from same geographical location. The only criteria for conducting a discussion with such a group was judgemental and guided by clear intent on the part of the field team to record relevant information as specified in research guide(s).

Similarly, key informants are defined as individuals selected on the basis of criteria such as knowledge, production/ trade / institutional relationship, age, experience, or reputation, who can provide required information in the context of the study as specified in research guide(s).

The research questions were referred to in preparing structured schedules for farmers and traders (Annexure-IV (a) and (b)). Both close ended and open ended questions were included to derive greater insights.

For a detailed study of livestock markets, a market intelligence guide (Annexure –V was developed for the field teams reference.

Adopted study approach:

It is a recognized fact that most parts of the livestock value chain in India are highly informal. The various categories of actors are not always well defined. There are individuals engaged

in multiple functions or dealing with different products. Traders are also highly mobile and unlikely to respond to direct queries related to their business. Being an informal market, supply flows are likely to be non-linear and dynamic, changing from day to day. It is difficult to derive representative budget information considering the non-linear supply system and inadequate records.

Considering these limitations and as pre-requisites for successful use of most of the proposed research tools for the study, the following approach was adopted:

- Trust building with various stakeholders
- Strategic communication taking care of group dynamics and expectations
- Sensitivity to local languages and culture
- Transparent engagement with local contacts and periodic sharing of information

Geographical delimitation and Sampling:

An exploratory situational analysis[4] taking state headquarter, major towns in bordering administrative divisions[5] and designated land custom stations as focus points in each state was conducted. Based on observation on general area typology and identified risk factors for disease transmission (annexure: VII) the following 10 criterion were identified for listing risky areas or sample areas for the study:

1. Observed general traffic (people / animal) in case of cross-border movement
2. Concentration of livestock
3. Presence of common grazing land or transhumance movement
4. Absence of border check post
5. Absence of reserved forest area[6]
6. Absence of border fencing
7. Available published reports of cattle smuggling
8. Presence of predominant livestock markets
9. Presence of known routes of animal movement
10. Presence of Land custom station

[4] A qualitative assessment based on travel to trade hub in state capital, land custom stations, prominent livestock markets, interaction with officials / veterinarians, key informant interview with traders / farmers etc.

[5] As per Government of India census -2011

[6] Reserve forest areas generally take extra precaution to prevent entry of domestic animals.

Scores (1 and 0: 1 to select a division against any given criteria) were given to various administrative division touching international borders based on secondary data, map study and findings of exploratory situational analysis. Those divisions having totalled score 3 and above are selected as 1st stage sample key investigation area (administrative divisions).

In those states where the 1st stage area sample is more than 15, it was proposed to conduct a second stage sampling to maintain the sample size at 15 considering resource constraint. While selecting final 15 places in the 2nd stage sampling due weightage was given to places with livestock markets and places without livestock markets applying the population proportion sampling.

Similar to the area selection, the in-country prominent livestock markets in each of study State are subjected to scoring (1 and 0: 1 to select a market against any given criteria) based on three criteria such as trade volume, number of feeding cluster and possible linkages with international trade. A maximum of five in country livestock market in each State with perfect score 3 or 2 (only when it scores 1 for criteria 'linkage to international livestock trade') were selected for detailed data collection. A volume bracket (average number of animal traded in any particular market day) for each State to determine high or low volume for corresponding scoring (1 for high 0 for low) was fixed for a State based on experience survey of average market volume of listed prominent markets in the concerned State.

An exponential discriminative snowball interviewing technique[7] was adopted for each of the sampled administrative division for collecting data using schedules. A sample of farmers and traders on snowball technique for a particular selected administrative division was restricted to border villages and livestock markets within the identified animal movement route of the division. The field team devoted 5 days in each sampled division to record interviews from as many farmers and traders as possible.

It was targeted to conduct a minimum of 3 Focus Group Discussions (FGD) in each select administrative division. Emphasis was given to ensure the homogeneity of the participants of the focus group discussion(s).

[7] is the type of snowball sampling where among the multiple referrals by the primary subjects at each level, only one is chosen as the subject of research

The selection of administrative division as area sampling unit was based on the Government of India (GOI) action plan for control of diseases which considers divisions as a geographical unit for routine surveillance.

Procedure for calculation of trade volume:

In absence of data on formal trade through land custom station and presence of multiple cross border entry routes (formal / informal), an assessment of illegal / unrecorded trade volume was made based on analysis of observed animal movement data collected from 5 identified strategic locations within the study areas e.g. border areas of five Indian states viz. UP, Bihar, West Bengal, Assam and Tripura (4 in Bihar and 1 in Tripura). Designed tally sheets (see annexure) for each of the strategic locations were used for counting vehicles and 'on foot' movement manually during identified peak hours. The peak hours for each of the location were decided based on findings of key informant interview.

Procedure for market system or value chain delimitation:

The guide on risk factors for transmission TADs and a guide on identified TADs with transmission pathway developed through expert consultation and reviews of secondary literature (Annexure- VII & VIII) served as basic guide for review of findings of the exploratory situational analysis for value chain delimitation.

Data Analysis:

The survey data collected was analysed using standard statistical methods and software. Value chain diagrams with description pertaining to activities, people, movement and motivation (for risky practices) was prepared and critical control points were explained in details. Screenshots from Google Maps were used to show cross-border and in-country livestock movement. Concerned guides related to TADs risk factors and transmission pathway developed based on secondary information was referred to in reviewing risky practices and in identifying / listing the risk hotspots. Analysed data, consultations, recorded learning of meetings and findings of key focus group discussions formed the basis for practical recommendations on value chain up-grading options for control of TADs.

Team building and orientation:

The field team in each of the study states under the over-all supervision of regional / state co-ordinators were selected based on previous survey experience, technical knowledge on

livestock farming and knowledge of geography / local conditions. One to one orientation workshops were organized in the respective study states where the team leader explained in details the study objective, expected output and outcome. A communication strategy, state level work-plan for field movement and approach for data collection / reporting for each of the state were finalized in consultation with all the team members. The team leader and other core team members extended handholding support to the field team during piloting of instruments and field data collection in two phases (phase –I : Exploratory situational analysis and phase-II : Data collection using schedules and guides)

Where required (to assist the field team in having access to certain areas and information) the members were introduced to government officials and key contacts with security agencies.

Pilot testing and finalization of guides and instruments

A consultative process with experts possessing relevant experience supported the finalization of various guides developed as a part of the study. The suggested schedule prepared during the inception workshop at Kathmandu for harmonization of data collection was further fine-tuned based on local contexts.

Pilot testing of schedules were conducted in West Bengal, UP and Bihar during initial days of exploratory situational analysis (Phase-I of data collection).

Study Limitations:

Following are the study limitations:

1. Government of India policy of restricted livestock trade through land custom stations is problematic and as such leads to an absence of data.
2. Inadequate data on population of livestock traders and livestock farmers. This seriously limits the scope for sample size determination.
3. Identification of real traders to interview is difficult as many people poised to be trader are actually commission agents.
4. Inadequate availability and access to various secondary data such as administrative division wise list of livestock markets, geographical stretch of border fencing, location of border check post and topographic details of border areas needed for criteria based selection of administrative divisions in border areas.
5. Limited access to digitalized maps and Survey of India topographical maps (in view of their restricted use in border areas).

6. Short time period of the study restricting more elaborate observation for un-recorded trade volume estimation.
7. The quantitative interviewee sample size is small and cannot be used for broder generalizations. The findings can, however, be indicative of the overall perspective.
8. On-going government crackdown on illegal livestock movement affecting cooperation from traders in many places.
9. Ethnic violence, political disturbances, threats from anti-social elements active in illegal trade and environmental extremes within the study areas affected the movement of the field teams.

Findings of exploratory situational analysis:

Identification of risky cross-border areas and livestock markets:

Based on criteria based scoring (annexure IX to XIII); following high risk administrative divisions in border areas and in-country livestock markets in each state were identified during exploratory study for detail data collection.

Uttar Pradesh:

Three administrative divisions of bordering Maharanganj district viz. Nautanwa (8) and Nichlaul (7) and Shravasti district viz. Bhinga (6) with score >5 (figure in bracket against name of administrative division shows the score as per developed tool) were identified as risky areas in the context of TADs.

The study could not list risky in-country livestock markets in UP (in the context of TADs) using the developed scoring tool, as there are no evidences of cross-border animal trade with any of the in-country livestock markets. Detail analysis of interviews conducted at Jubairganj Market of Faizabad district based on initial report of cross-border linkage was inconclusive. The market is however important in the context of in-country movement of animals.

Analysis of secondary data of 868 livestock markets indicated that the 16 districts of western UP (Viz. Agra, Aligarh, Badaun, Bulandshahar, Etah, Ferozabad, Gautam Buddha Nagar, Ghaziabad, Hathras, J.P.Nagar, Mathura, Meerut, Baghpat, Saharanpur, Muzaffarnagar and

Muradabad) that are being covered under GOI's FMD-CP as controlled area houses as much as 23.27% (amounting to 202 in number) of the total livestock market in UP (Fig 1)

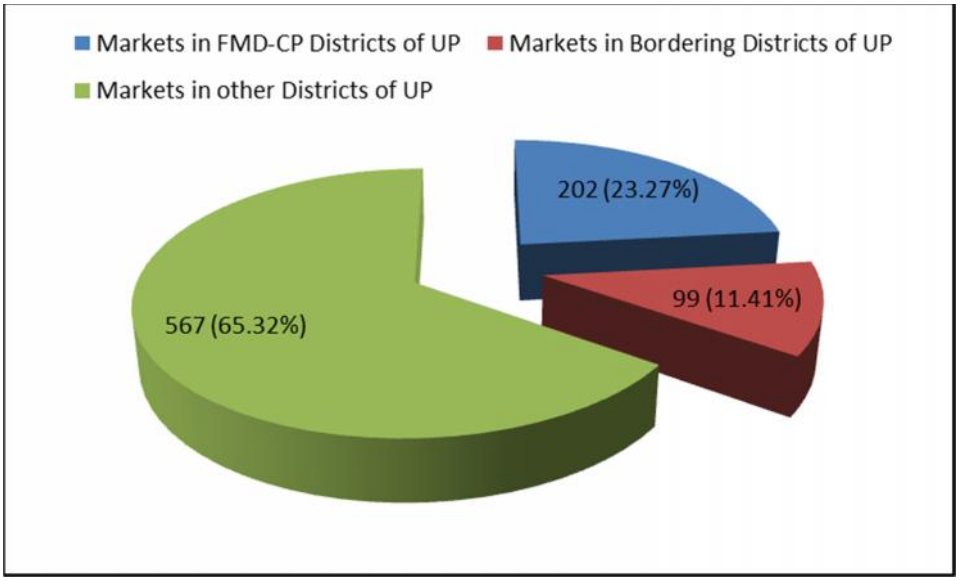


Figure 1 Distribution of Livestock Markets in UP (Data Source: Animal Husbandry Department, UP)

The total number of livestock markets within the 7 bordering districts with Nepal (viz. viz. Pilibhit, Siddhartha Nagar, Balarampur, Bahraich, Shravasti, Maharajganj and Lakhimpur Kheri) is 99 which is 11.41% of total markets in UP. If we consider livestock markets in 12 administrative divisions of bordering districts that touches the border with Nepal, the number farther goes down to 30 i.e. only 3.5% of total markets in UP (Fig 2). It is to be noted that bordering Bhinga administrative division of Shravasti district host as high as 7 livestock markets.

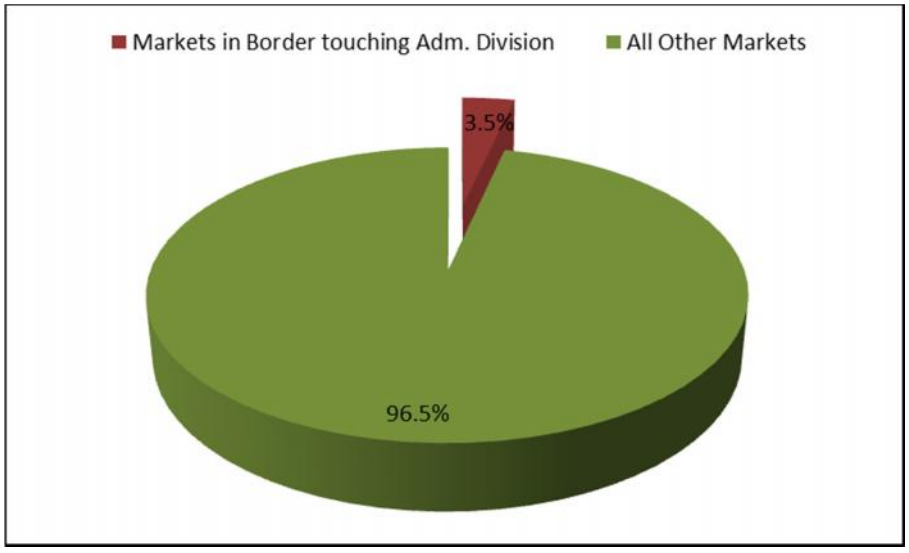


Figure 2 Percent livestock markets in bordering administrative divisions of UP with Nepal (Data Source: Animal Husbandry Department, UP)

Amongst the zones, 5 zones viz. Lucknow, Meerut, Allahabad, Aligarh, Bareilly showed highest concentration of markets. Zone wise distribution of markets is shown in Fig 3.

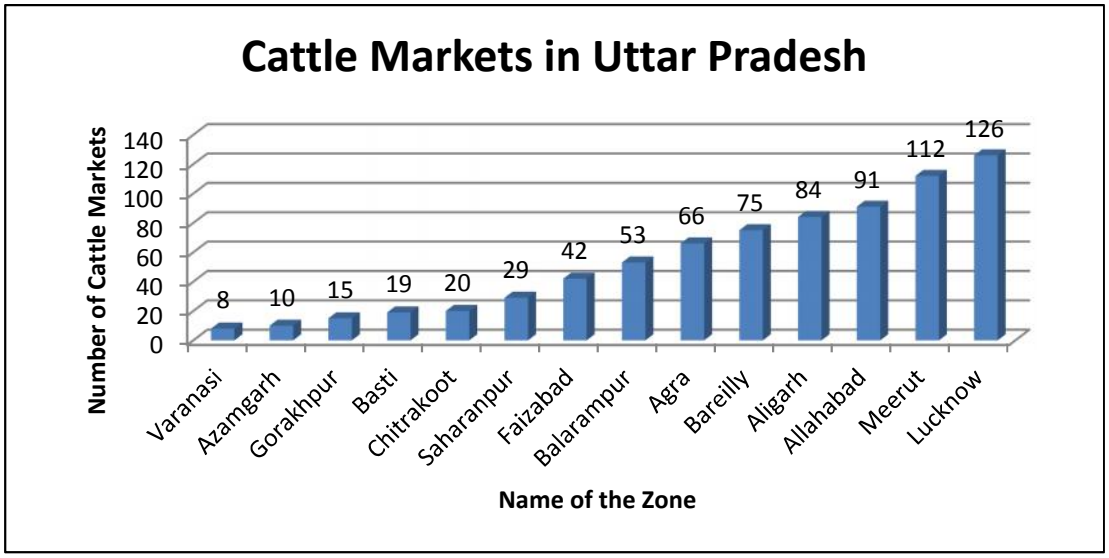


Figure 3 Zone wise distribution of markets in UP (Data Source: Animal Husbandry Department, UP)

Bihar:

Fifteen administrative divisions with score >5 as per developed tool were identified as risky areas. The names of these divisions along with score are: Nirmali (7), Forbesganj (7), Jainagar (7), Sonbarsa (7), Basantpur (6), Kursakatta (6) Terhagachii (6), Harlakhi (6), Laukaha (6), Laukahi (6), Bargania (6), Adapur (6), Sidhaw (6), Gaunaha (6) and Sikta (6)

Based on criteria based scoring following 10 in-country livestock markets were identified as risky markets: (Place in bracket shows administrative division and districts where market is located)

Mansi (Mansi, Khagaria), Fatwah (Fatwah, Patna), Hardi (Muzaffarpur, Muzzafarpur), Banmankhi (Banmankhi, Purnia), Kasba (Kasba, Purnia), Dagarua (Dagarua, Purnia), Gulabbag (Purnia), Kheriahatt(Korha, Katihar), Sonali (Kadwa, Katihar), Mallikpur (Balarampur, Kathihar).

Analysis of district wise number of markets indicated following 11 districts as one with 5 or more number of livestock markets (Fig 4). This indicates concentration of markets in Araria and Kishanganj area.

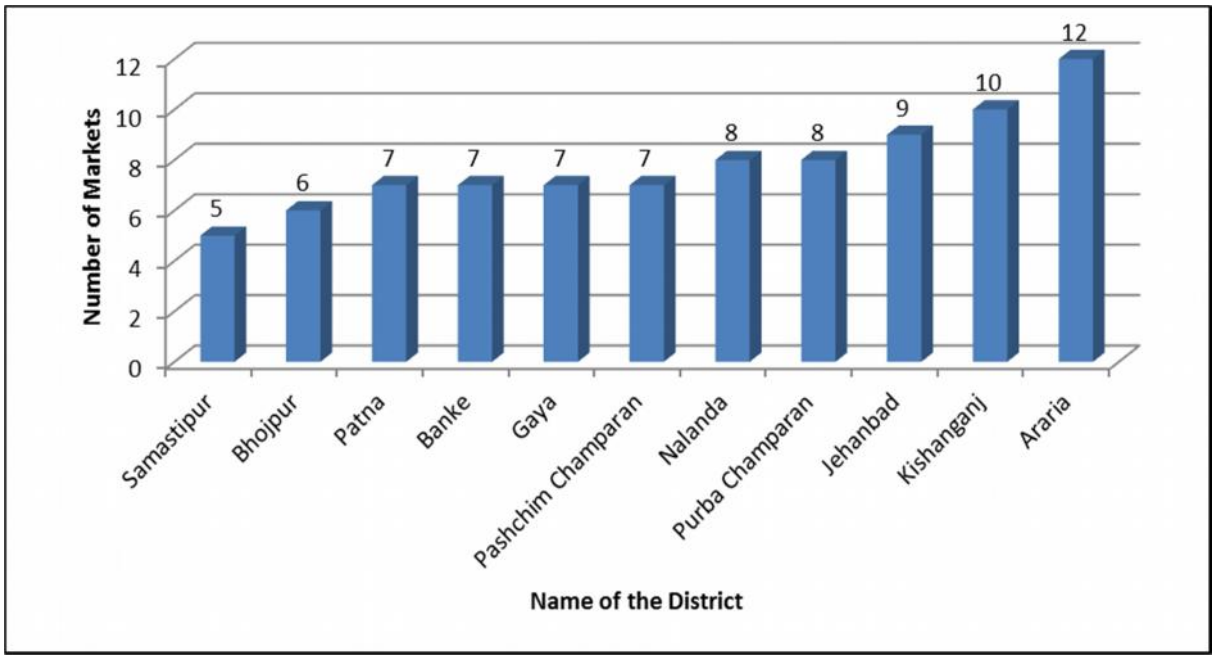


Figure 4 District with 5 and more number of livestock markets.

Amongst the 9 administrative zones, 3 zones viz. Purnia, Patna and Magadh shows highest concentration of markets. Zone wise distribution of markets is shown in Fig 5.

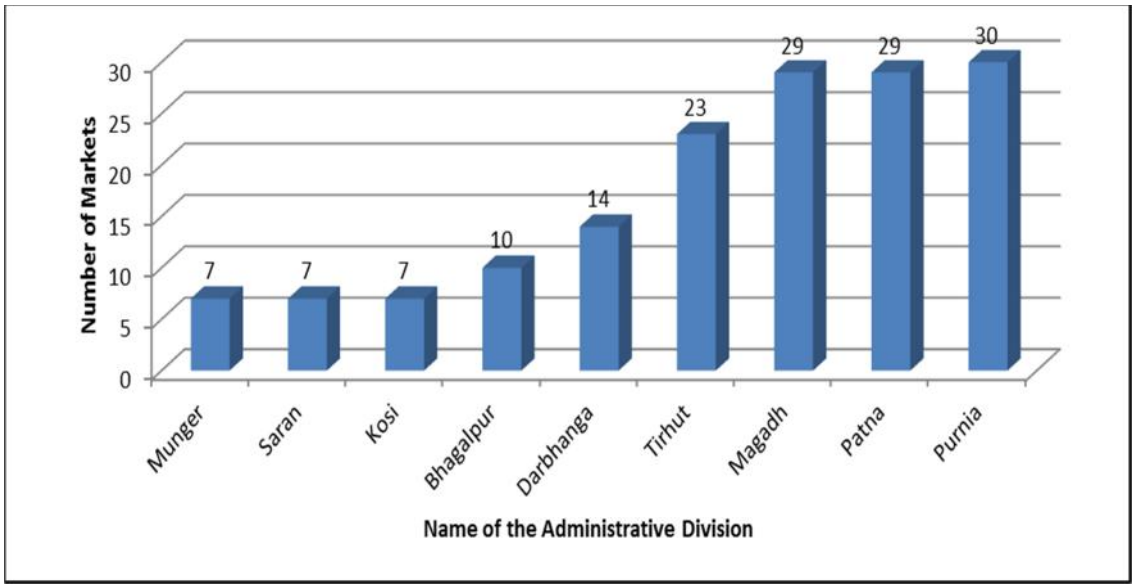
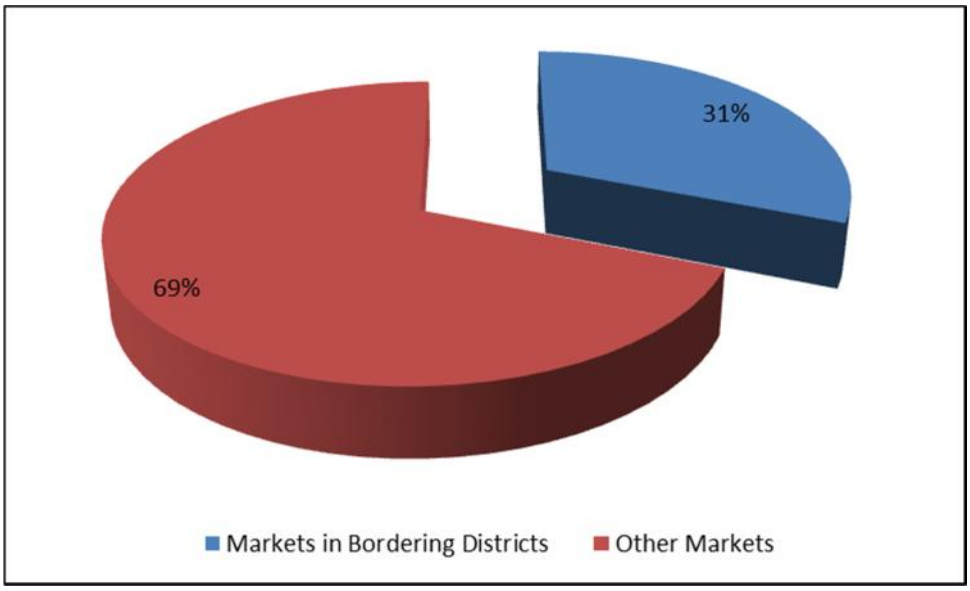


Figure 5 Administrative division wise distribution of livestock markets in Bihar

As high as 31% of livestock markets (out of total livestock markets in Bihar) were located in 7 bordering districts of Bihar with Nepal viz. Supaul, Araria, Kishanganj, Madhubani, Sitamarhi, Purba Champaran and Pashchim Champaran.



West Bengal:

Twelve administrative division viz. Naxalbari, Kahribari, Phansidewa, Jalpaiguri, Bongoan, Gaighata, Swarupnagar, Basirhat-I, Hasnabad, Hilli, Islampur and Mekliganj were identified as risky areas.

Based on criteria based scoring, the following seven in-country livestock markets were identified as risky in the context of TADs.

1. Sukhbazar (Illambazar, Birbhum district)
2. Sainthia (Birbhum)
3. Guskara (Asugram-I, Burdwan)
4. Panchundi (Ketugram-II, Burdwan)
5. Fekoghat (Gopiballavpur-II, Medinipur-west)
6. Laxmisagar (Simlapal, Bankura)
7. Pandua (Hooghly district).

The secondary data of district wise livestock markets in West Bengal is not complete and as such could not be analysed. It is however, interesting to observe that most of the livestock markets with high volume transactions are located in 5 in-country western districts only. These are Birbhum, Burdwan, Bankura, Medinipur and Hooghly district.

Assam:

Ten administrative divisions in seven bordering districts viz. South Salmara, Patharkandi, Nilambazar, Karimganj, Katigora, Bengtal, Tamulpur, Jalah, Gosaigoan and Kokrajhar were identified as risky areas.

Based on criteria based scoring, the following five in-country livestock markets were identified as risky in the context of TADs.

1. Na mile cattle market (Near Guwahati, Assam – Meghalaya border)
2. Gauripur market of Dhubri district
3. Anipur in Karimganj district
4. Kaliganj in Karimganj district
5. Tulsibari in Kamrup (Rural District)

In absence of compiled district wise list of livestock markets in Assam, no analysis could be undertaken.

Tripura:

Five administrative divisions viz. Khowai (District: Khowai), Boxanagar, Melaghar, Kathalia (all in District: Sipahijala), Gournagar (District: Unokoti) were identified as risky areas in the context of TADs.

Following are the five identified risky in-country livestock markets in Tripura.

1. Barpathari (Belonia)
2. Jamjuri (Udaipur)
3. Melaghar (Melaghar)
4. Machli (Manughat)
5. Ramnagar (Dharmanagar)

The cross-border and in-country livestock movement routes:

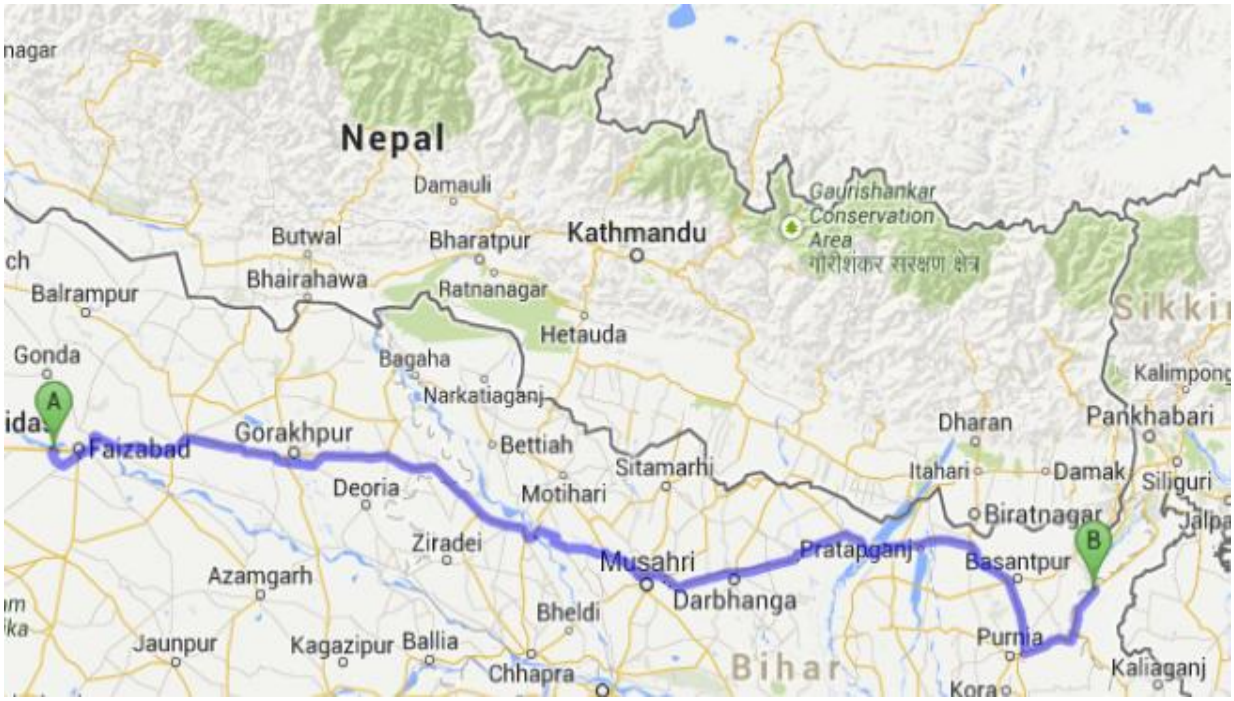
Uttar Pradesh (UP) and Bihar:

No organized illegal cross-border movement of cattle / buffalo from Nepal to India and vice versa via border in UP could be recorded. There are organized attempts for livestock trading across border areas in Bihar. KIIs conducted near Indo-Nepal border in UP indicated that herds of sheep from Nepal migrate to the Indian side and they go for grazing up to Gorakhpur.

The following in-country routes (touching NH 28, NH 57 and parts of NH 19 as shown in Map 1,2,3) having link to cross-border livestock trade with Nepal, were identified for movement of cattle and buffalo from UP to Kishanganj in Bihar-West Bengal border. There are occasional reverse movement from Bihar to UP with the establishment of large number of meat plants in UP (24 out of 42 certified export oriented meat plants in India).

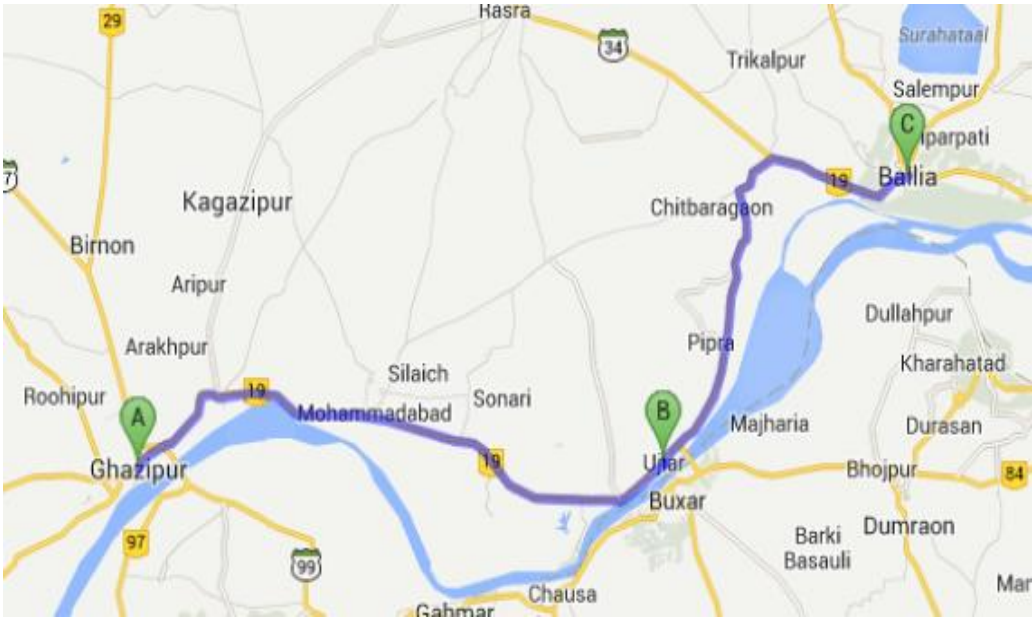
1. Faizabad (Location of biggest cattle market) –Gorakhpur –Kushinagar- Darbhanga – Pratapganj –Purnia – Kishanganj (NH 57 , NH 31) – (Refer Map 1)
2. Allahabad- Mugalsarai – Buxar-Ara-Patna-Barauni – Begusarai-Khagaria – Purnia – Kishanganj. (Refer Map 2)
3. Ghazipur – Gorakhpur – Kushinagar – Darbhanga –Pratapganj –Purnia – Kishanganj (Refer Map -3)
4. Ghazipur -Mohammadabad – Ujyar ghat (UP-Bihar border) to Buxar (Bihar) OR Chapra in Bihar via Ballia (UP –Bihar border) – Kishanganj.

Data obtained from department of Animal Husbandry and Veterinary, Government of UP indicated presence of departmental border check post at Ujiyar Ghat (Refer Map 3) which is on the livestock movement route. Secondary data of recorded livestock movement and logical route map analysis indicates Peterwa police station area in Kushinagar as another suitable location for such departmental check-post. (Refer Map4)

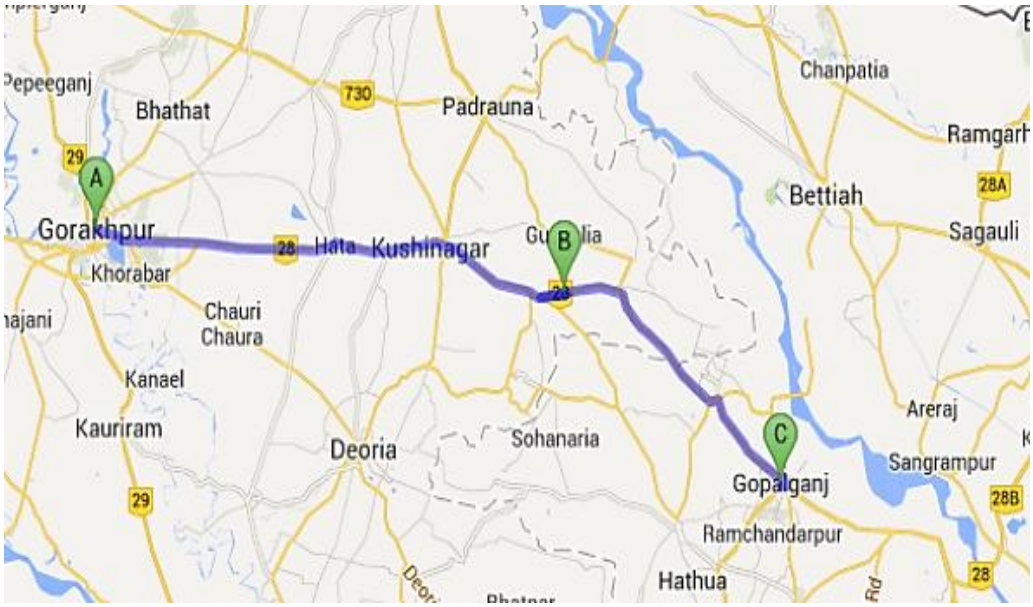


Map 2 A major in-country livestock movement route from Juberganj livestock market (Faizabad) to Kishanganj (Bihar)

Map 3 A major in-country livestock movement route from Allahabad to Kishanganj via Begusarai



Map 4 A major livestock movement route from Ghazipur (UP) to Bihar with entry points at Ujair ghat (B) and Ballia (C)



Map 5 Indicating point (B)-Peterwa as possible location for livestock health check post.

The state of UP is witnessing large scale in-country movement of cattle which are mostly destined to Bangladesh via border areas of West Bengal. An analysis of 3 years data on crime records (registered cases) pertaining to illegal live cattle transport in UP indicates as high as six zones viz. Meerut, Bareilly, Allahabad, Saharanpur , Varanasi and Lucknow as sensitive. (See Fig 6)

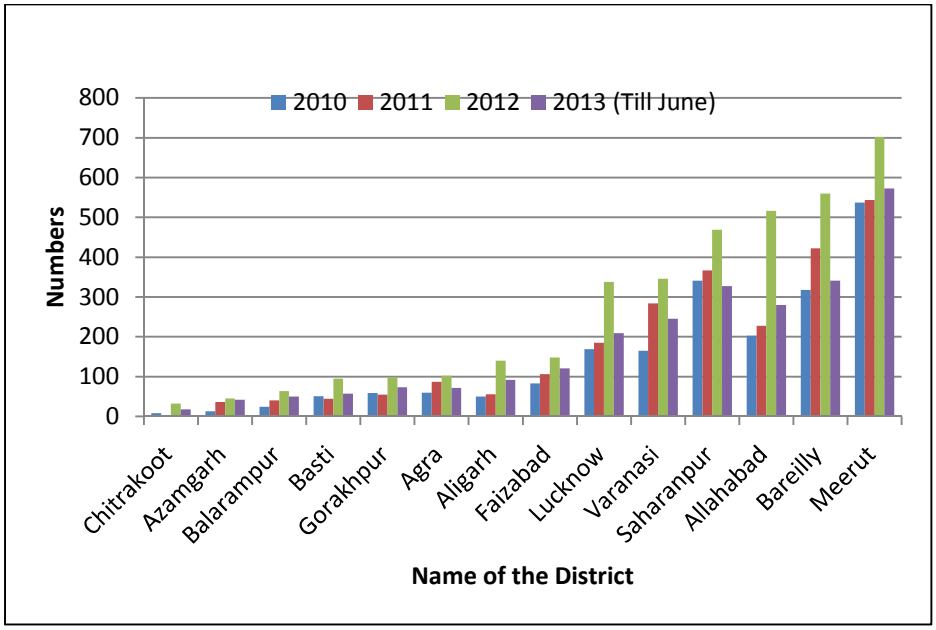


Figure 6 Zone wise registered police cases on illegal cattle transport in UP

Analysis of data pertaining to cattle rescued (See Fig 7) however, indicates that Meerut, Allahabad, Chitrakoot, Gorakhpur, Basti, Saharanpur and Varanasi are sensitive areas. It is to be noted that the number of registered cases are lowest in case of Chitrakoot but in terms of recued animals it ranks 3rd amongst all zones in UP.

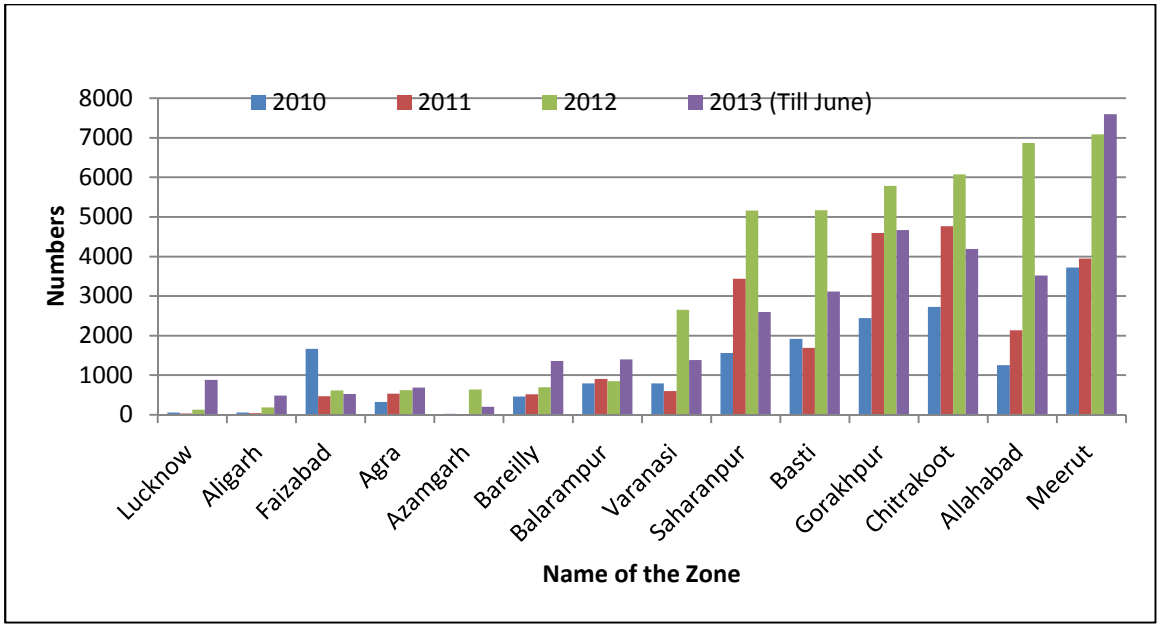


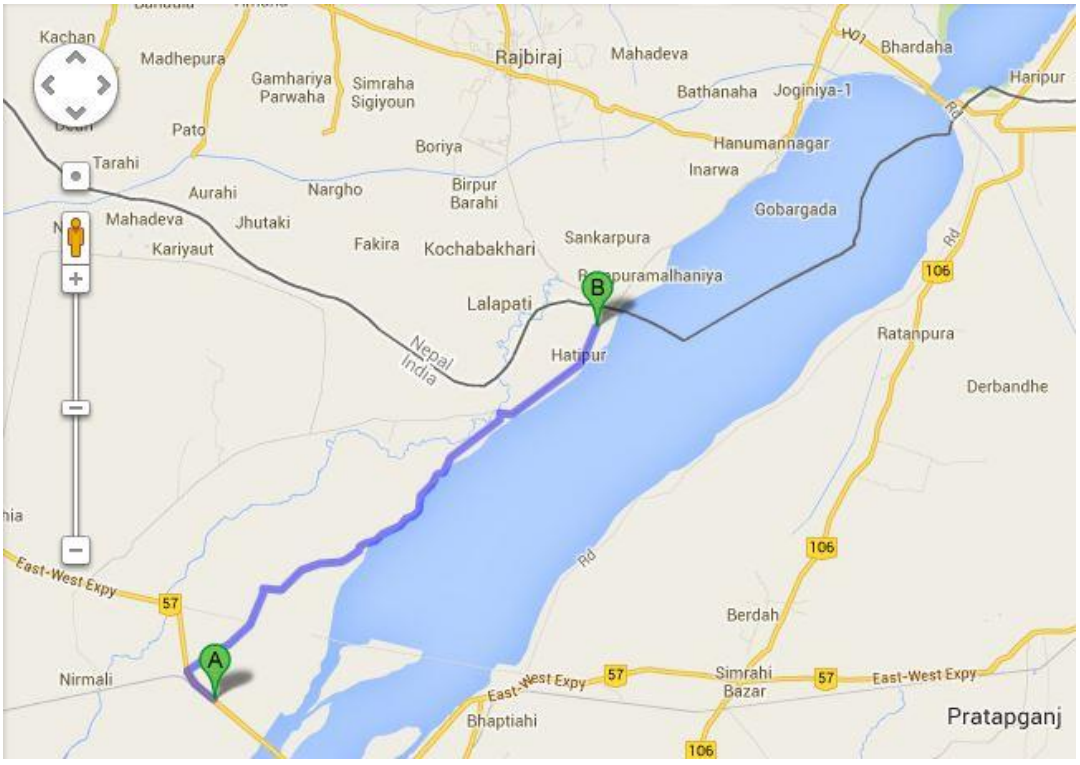
Figure 7 Zone wise rescued transported animals by police in UP

Considering reports of organized illegal cross-border cattle movement, the study team conducted a detailed survey of each of the bordering administrative divisions in Bihar with Nepal to record movement corridors. There are multiple illegal cross border animal movement corridors which mostly join the major in-country routes as described above. The FGDs conducted in Bihar indicates west to east movement of cattle and buffaloes even within Nepal.

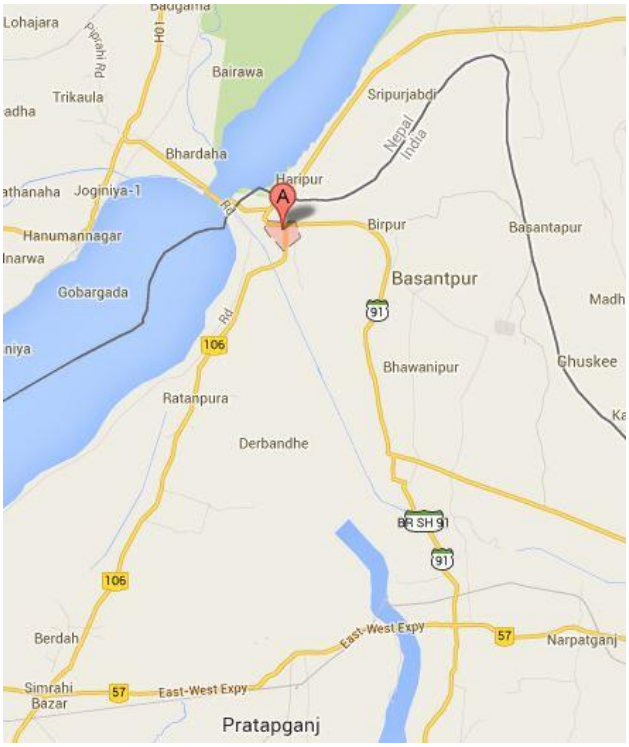
Analysis of animal movement reports (annexure XIV) indicates following prominent movement routes in 7 bordering districts of Bihar with Nepal.

District: Supaul (Refer Map 5 and 6)

- Route starting from Kunauli (Indo-Nepal border) to Majhari Chowk in N H57
- Various routes starting from areas near Bhimnagar barrage of Basantpur (Birpur) up to N H 57.



Map 6 Showing road from Majhari Chowk in NH57 (A) to Kunauli (B) bordering Nepal



Map 7 Showing Bhimnagar Barrage on River Koshi in Nepal border

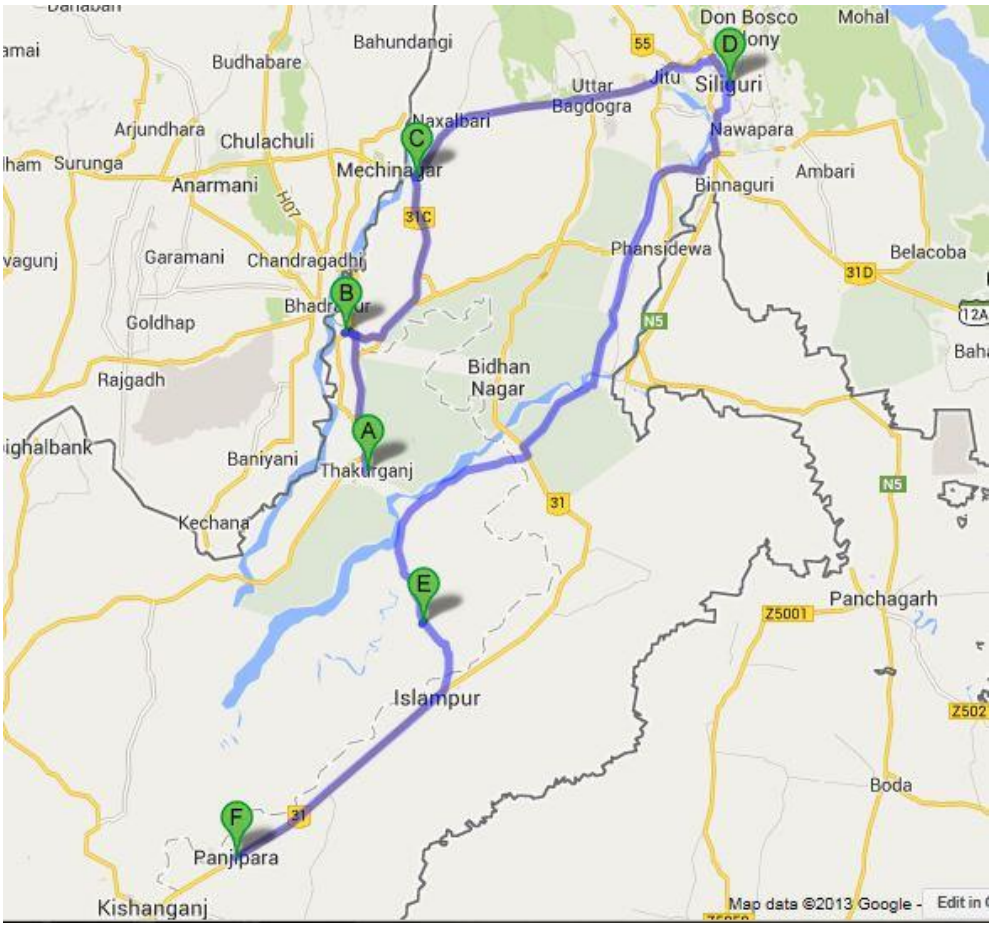
District: Araria (Refer Map 7)

- Border areas of Narpatganj (Stretch from Birpur to Forbejganj)
- Border stretch from Kusakatta to Thakurganj via Sikti

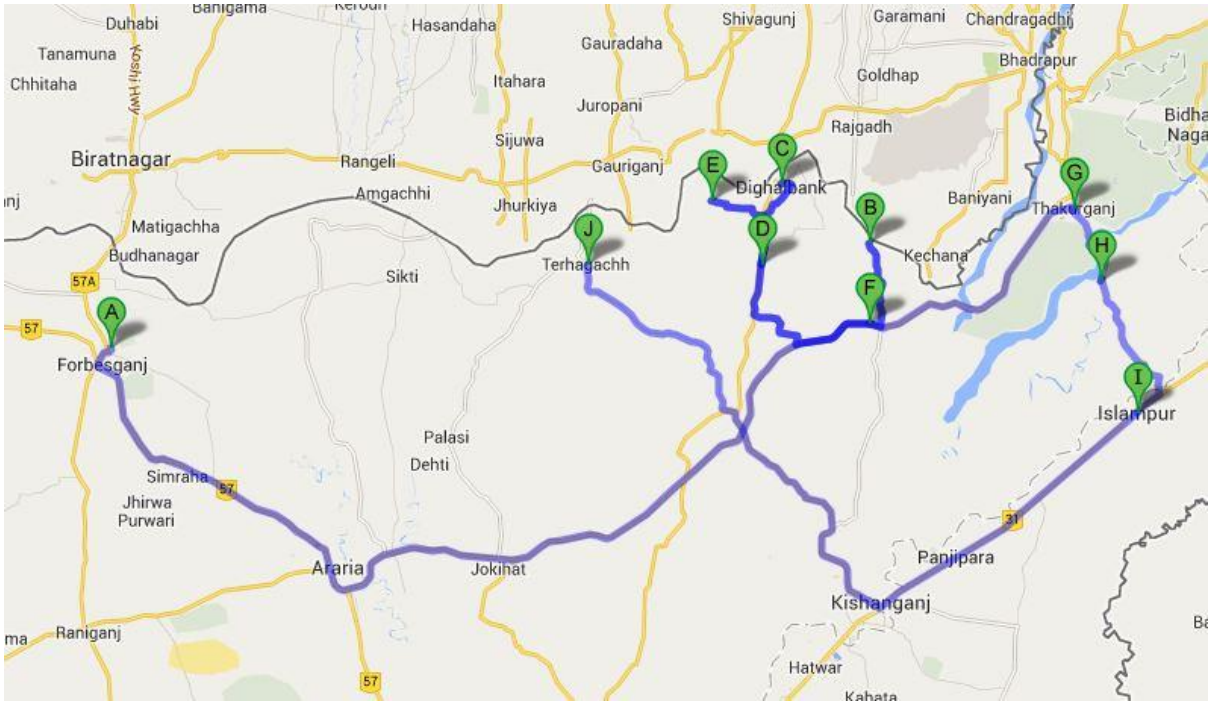
Map 8 Green dots indicating open border areas in Narpatganj division where animal movement on foot takes place from Birpur to Forbesganj.

District: Kishanganj (Refer map 8 and 9)

- Border areas of Galgalia and Panitanki with animals reaching up to Panjipara and Siliguri
- Border areas of Dighalbank , Terhagachh (Places in the routes includes : Matiari , Singhimari, Tapu, Lohagarha, Pawa khali, Thakurganj, Taiabpur, Islampur)



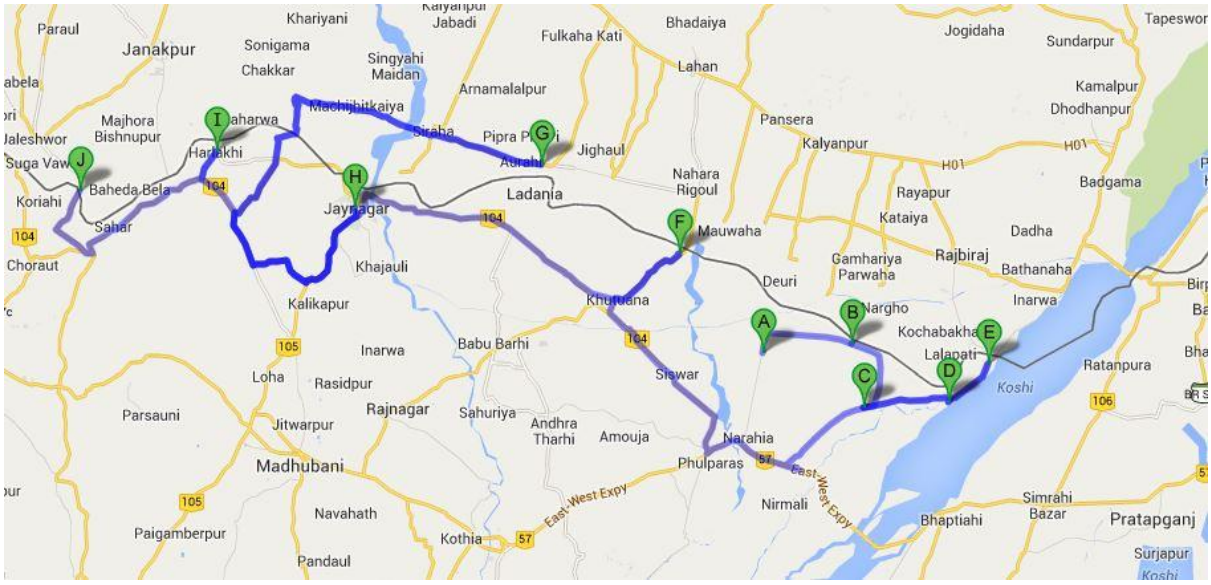
Map 9 A-Thakurganj B-Galgalia C-Panitanki D: Siliguri E-Pothia F- Panjipara



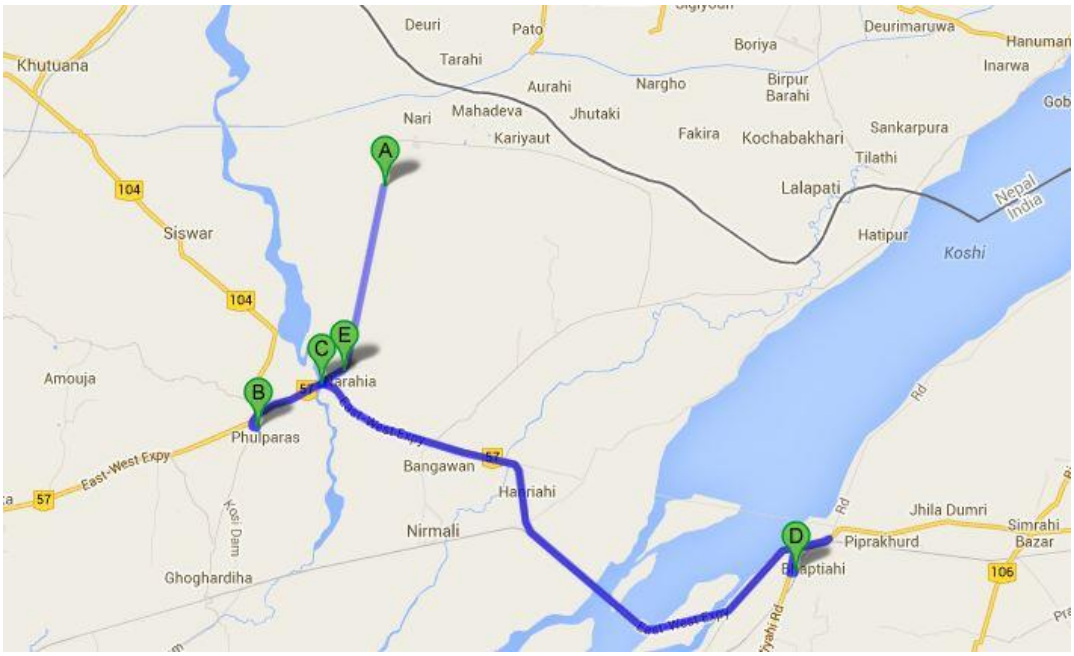
Map 10 A-Matiari B-Singhimari C-Dighalbank – D-Tapu E-Lohagarha F- Pawa khali G-Thakurganj H- Taiabpur I-Islampur – J: Terhagachh

District: Madhubani (Refer Map 10, 11 and 12)

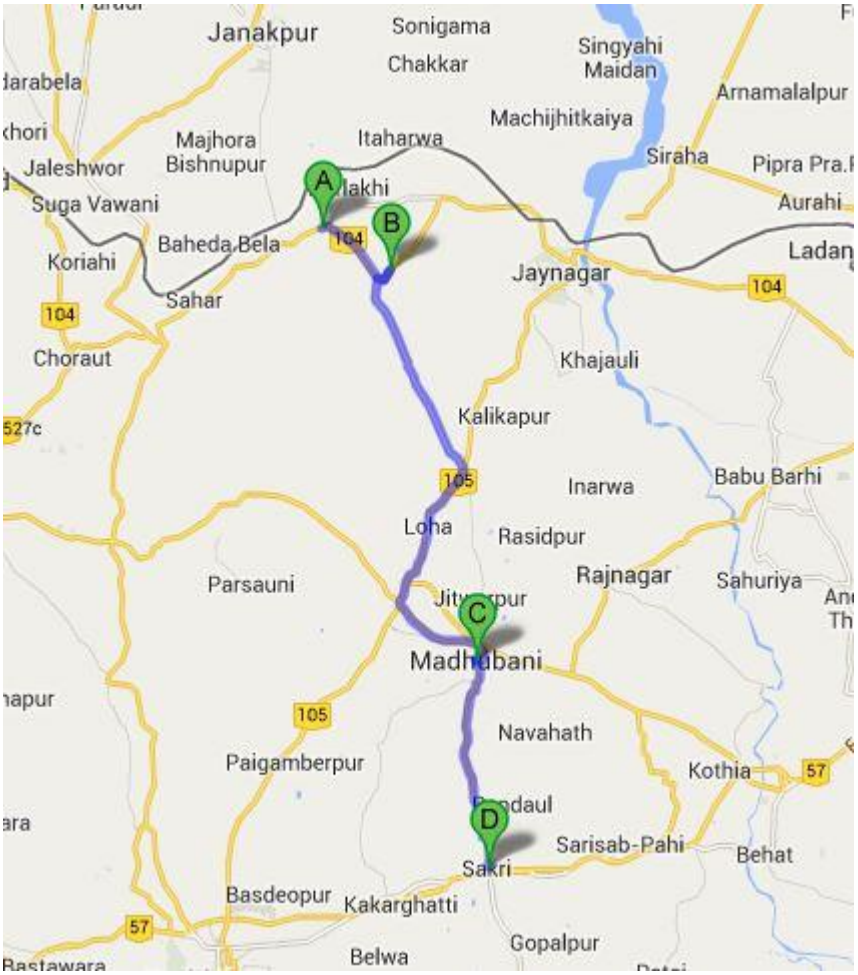
- Routes covering Laukahi, B-Andhramath C-Mahadeomath D-Dagmara E-Kunauli F-Loukaha G-Ladania H-Jainagar I-Harlakhi J-Madhwapur (animal movement mostly on foot can be observed in this route)
- Route covering Laukahi, Phulparas, Bhutahi Balan, Bhaptiahi and Narahia (animal movement in vehicles can be observed in this route)
- Route covering Umgoan, Basopatti, Madhubani, Sakri (animal movement in vehicles can be observed in this route)



Map 11 A- Laukahi, B-Andhramath C-Mahadeomath D-Dagmara E-Kunauli F- Loukaha G-Ladania H-Jainagar I-Harlakhi J-Madhwapur



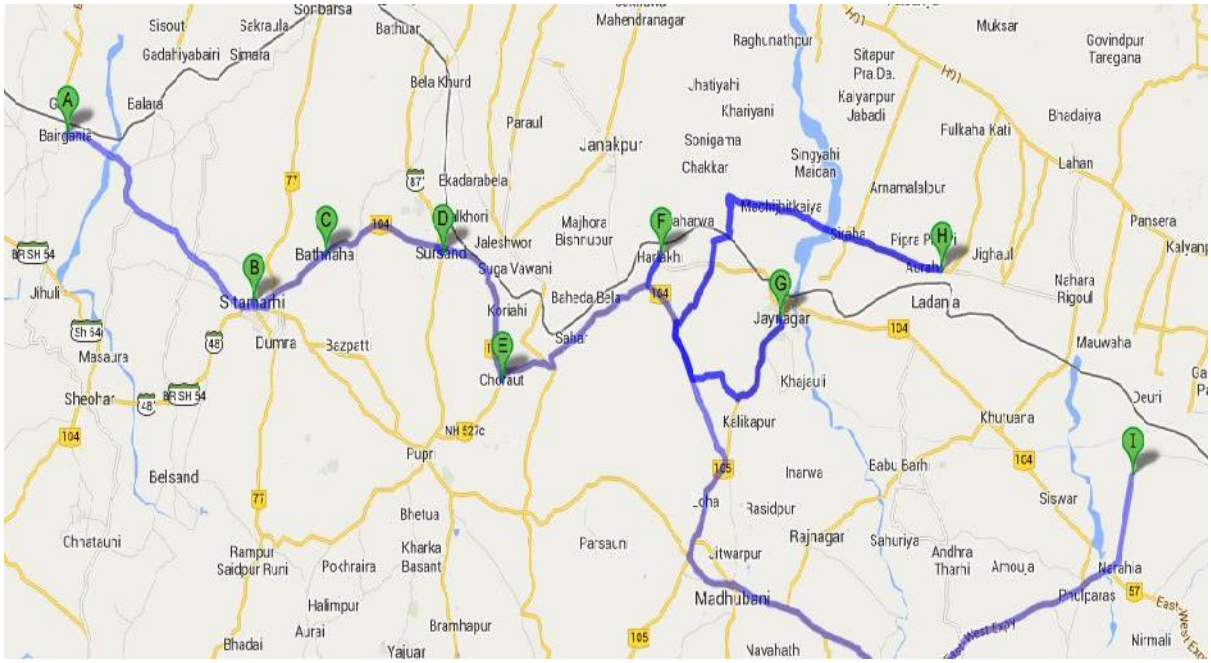
Map 12 A-Laukahi B-Phulparas C-Bhutahi Balan D-Bhaptiahi E-Narahia



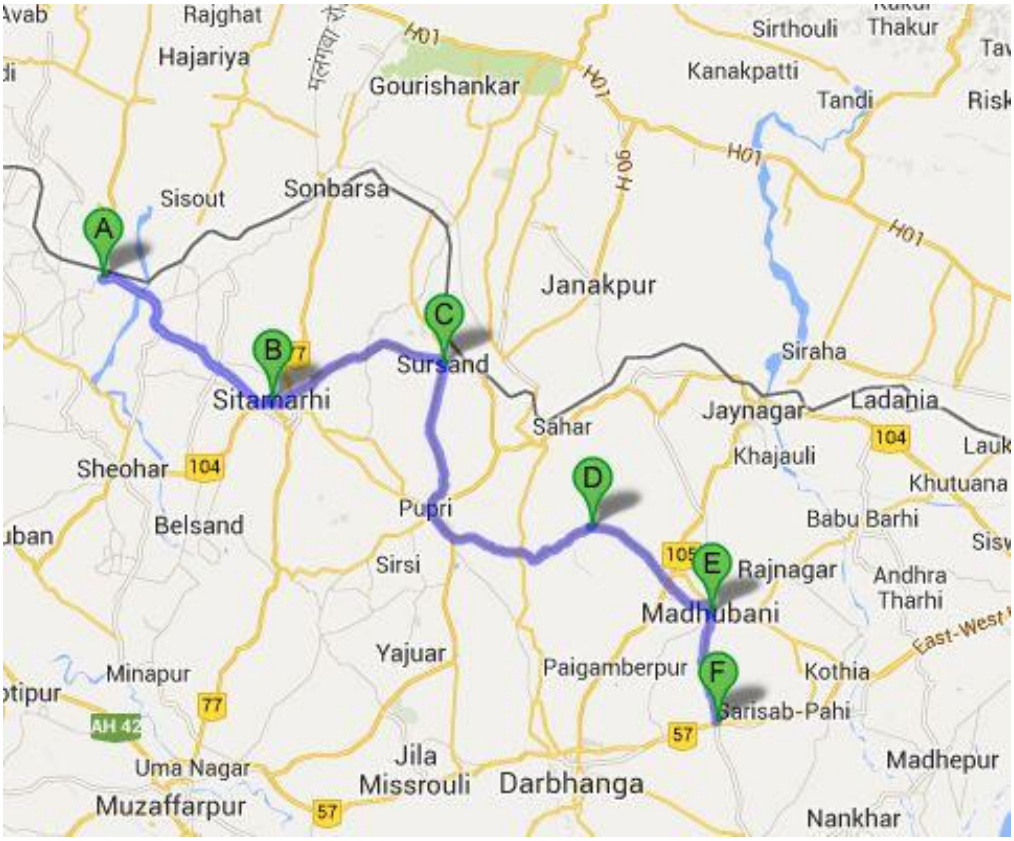
Map 13 A-Umgoan B-Basopatti C-Madhubani D-Sakri

District: Sitamarhi (Refer Map 13 and 14)

- Route covering areas like Bairgania, Sitamarhi, Bathnaha, Sursand, Choraut, Harlakhi, Jainagar , Ladania, Laukahi (animal movement mostly on foot can be observed along this route)
- Route covering Bairgania, Sitamarhi, Sursand, Benipatti, Madhubani up to Sakri (animal movement in vehicles can be observed in this route)



Map 14 A-Bairgania B-Sitamarhi C-Bathnaha – D- Sursand E-Choraut F-Harlakhi G- Jainagar H-Ladania –I-Laukahi

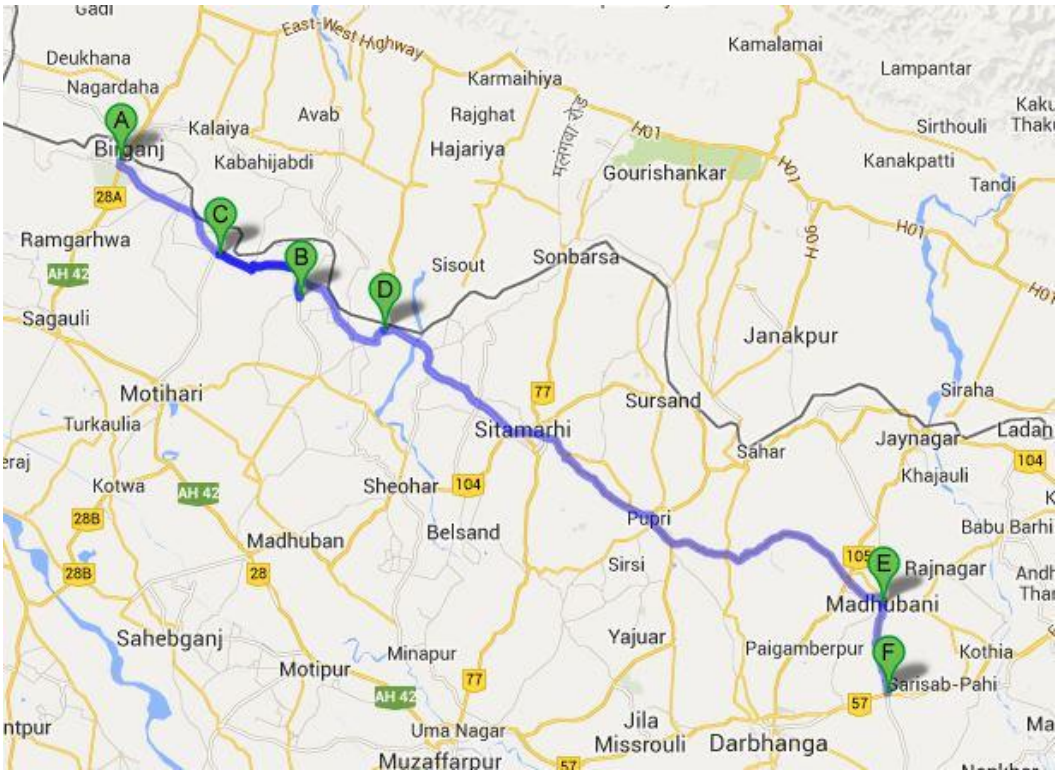


Map 15 A-Bairgania B-Sitamarhi C- Sursand –D-Benipatti E-Madhubani F-Sakri

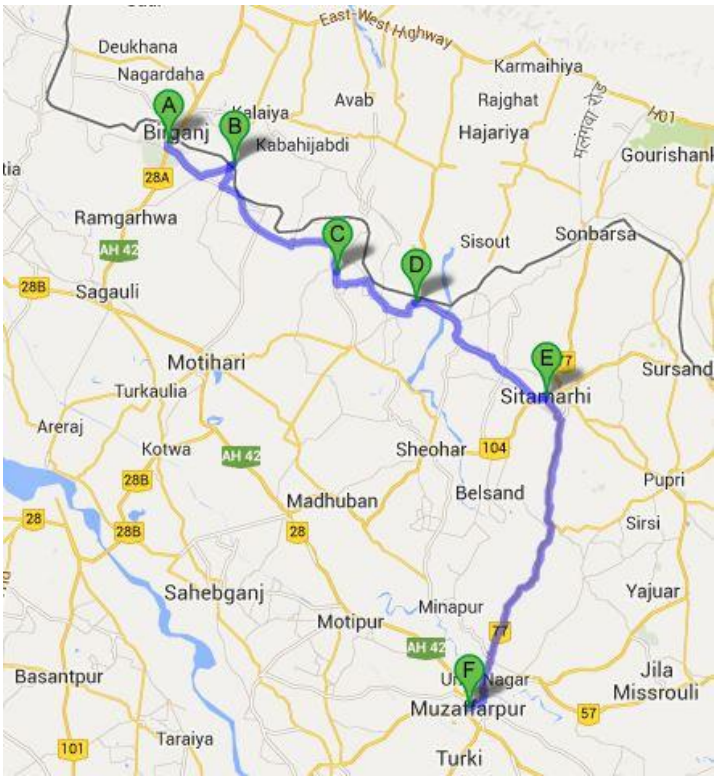
District: Purbi Champaran (Refer Map 15 and 16)

- Route covering Raxaul, Ghorasahan Kadamwa, Chauradano, Bairgania, Madhubani up to Sakri (Animal movement both on foot and in vehicles can be observed in this route)

- Route covering Raxaul, Adapur, Ghorasahan-Kadamwa, Bairgania, Sitamarhi up to Muzaffarpur



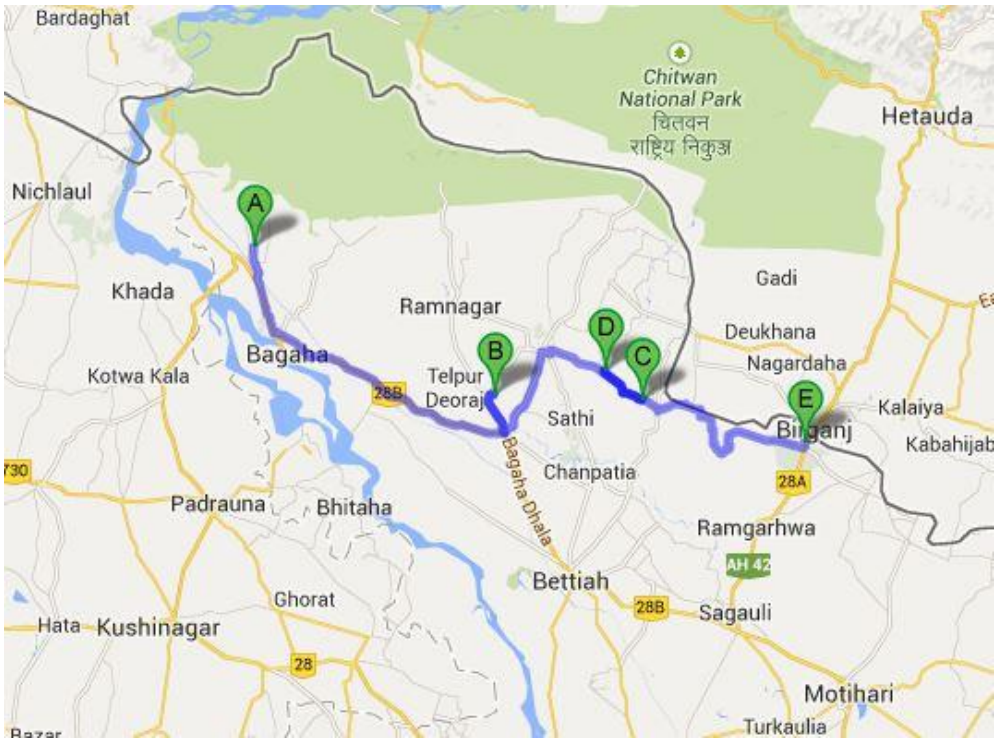
Map 16 A-Raxaul B-Ghorasahan, Kadamwa C- Chauradano, D-Bairgania E-Madhubani F-Sakri



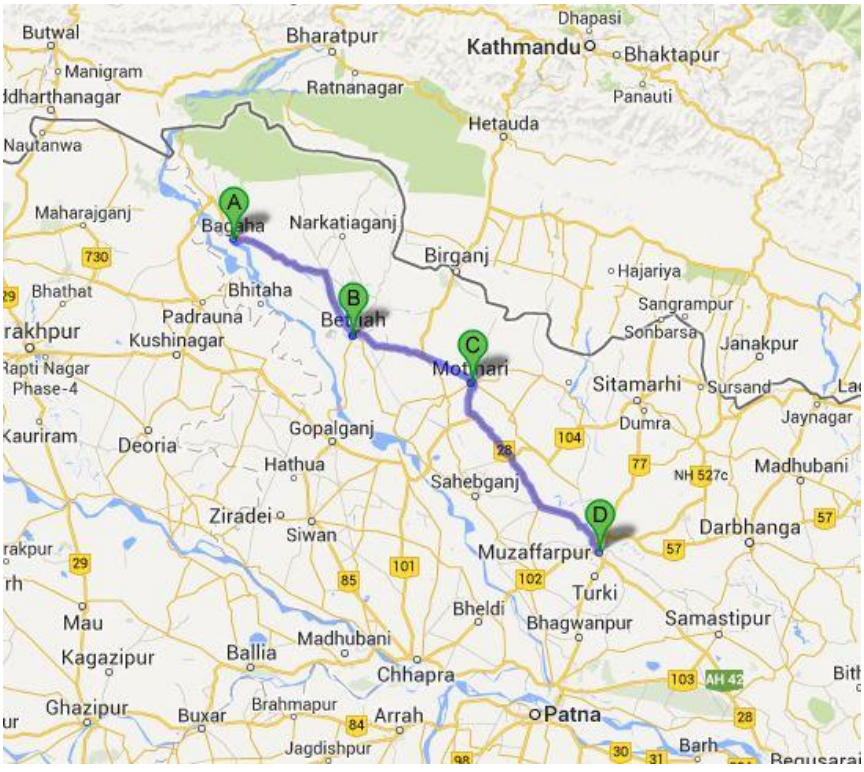
Map 17 A-Raxaul B-Adapur C- Ghorasahan, Kadamwa D- Bairgania E-Sitamarhi F-Muzaffarpur

District: Pachim Champaran (Refer map 17 and 18)

- Route covering Sidhaw, Sikta, Marjadwa, Gokhula and Raxaul
- Route covering Bagha, Bettiah, Motihari up to Muzaffarpur

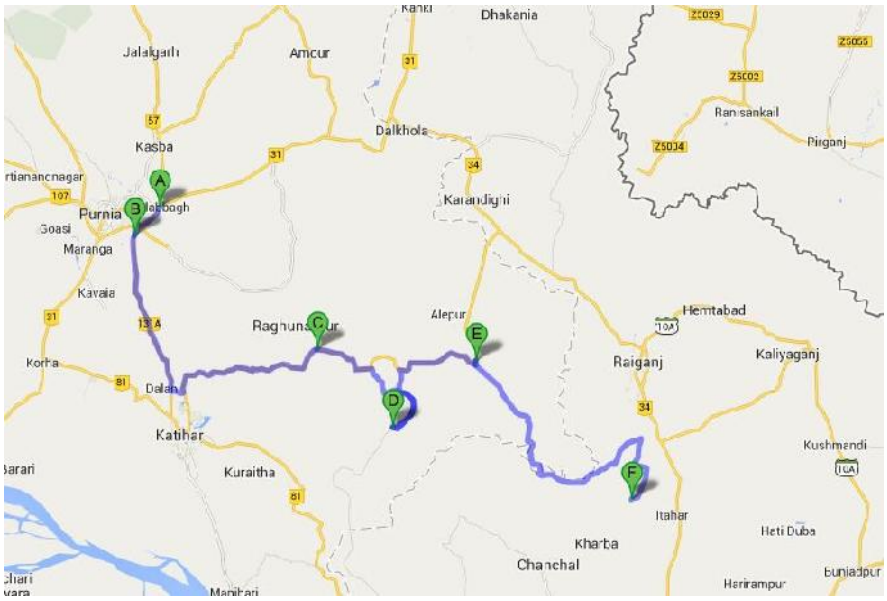


Map 18 A-Sidhaw B-Sikta C-Marjadwa D-Gokhula E-Raxaul

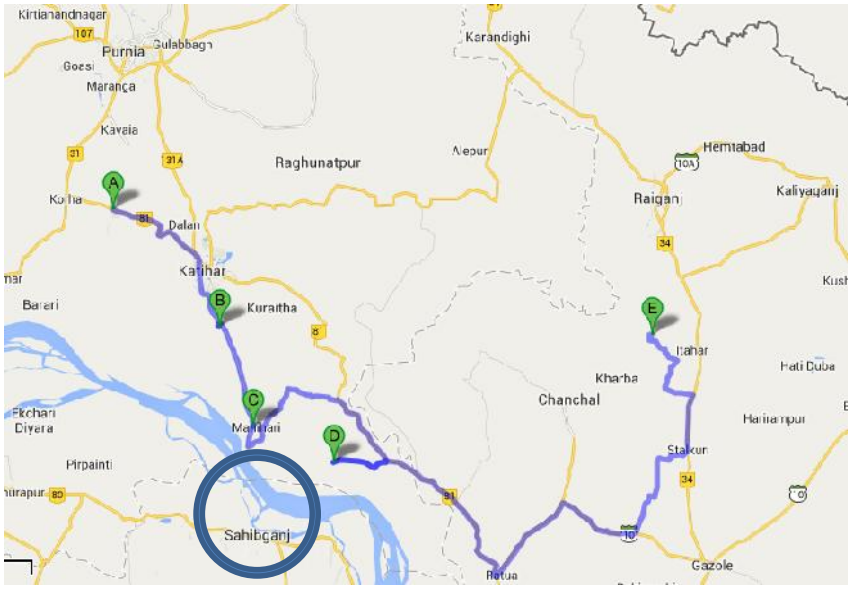


Map 19 A-Bagha B- Bettiah C-Motihari D- Muzaffarpur

Although the majority of animal movement to West Bengal / Bangladesh from Northern Bihar occurs through NH 57 and NH 31 via Kishanganj, FGD's indicated that substantial animal movement from places near Purnia to Kusida livestock market of Malda via Belauri, Khadwa, Azamnagar, Kumedpur (Map 19) etc. or Kheria Haat, Manshahi, Manihari, Amdabad, Kumedpur (Map 20). Animals from Sahebganj of Jharkhand (see circle in Map 20) enters Manihari (Point C, Map 20) taking river route (river Ganga). It is to be noted that Zero mile area of Gulabbagh (Point A of Map 19) is the place where NH 57 from UP/ Bihar touches NH 31.

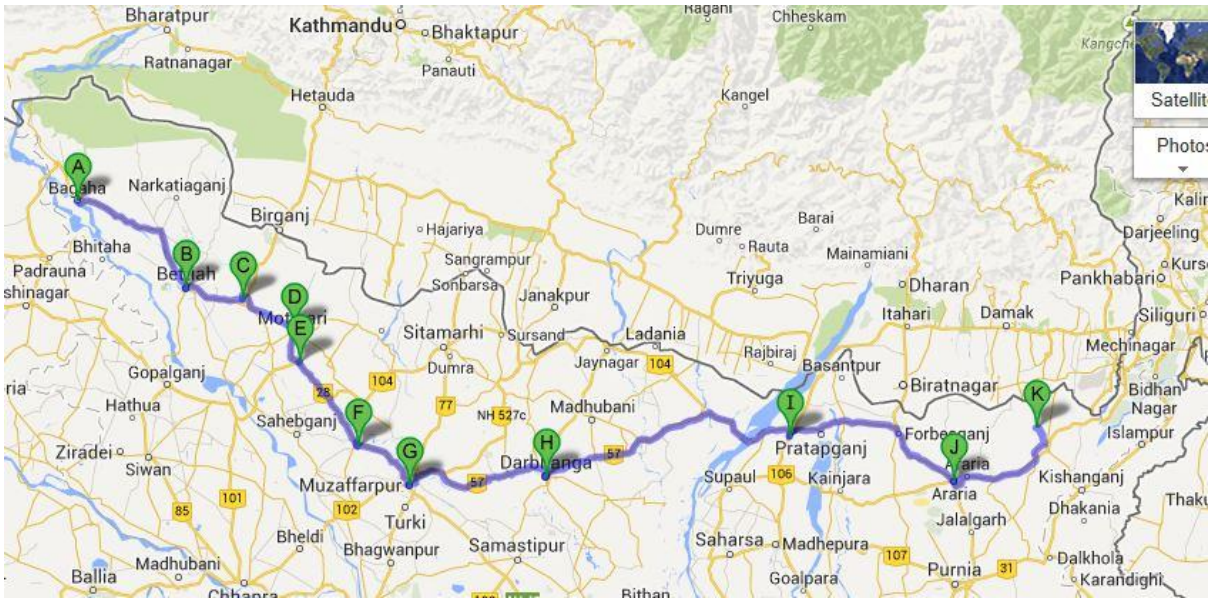


Map 20 Alternative route from Gulabbagh (Purnia) via Kumedpur to Kusida hat of Malda district in West Bengal (A-Gulabbagh B-Bilauri C-Kadwa D-Azamnagar E-Barsoi F-Kumedpur

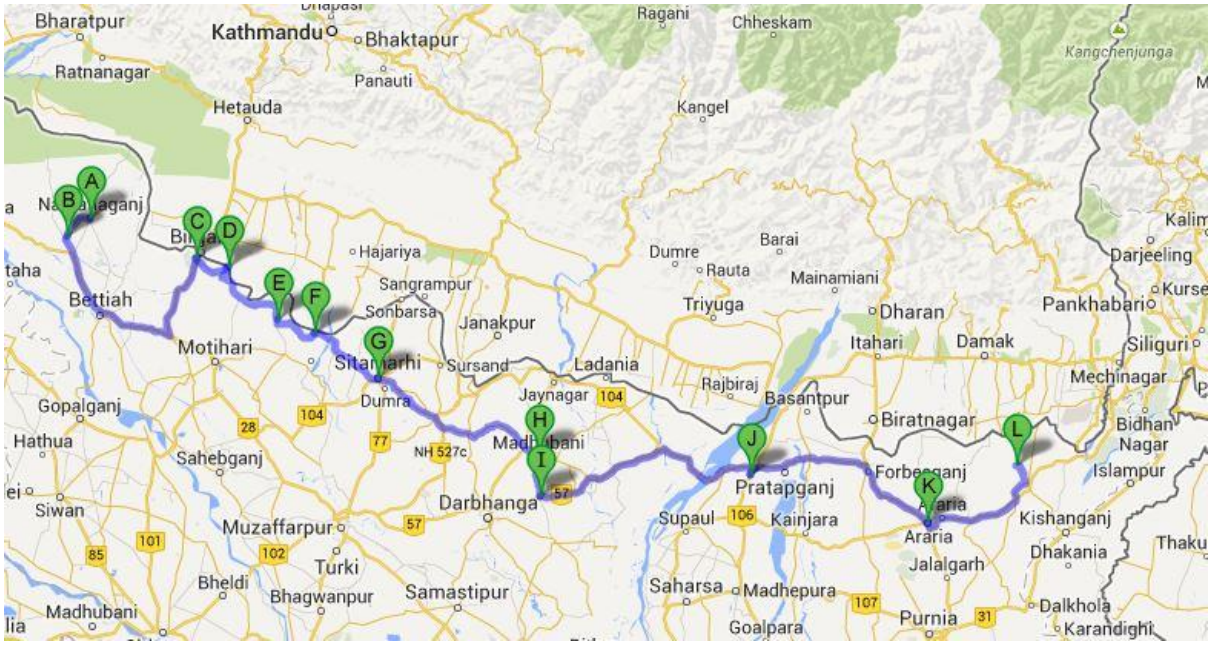


Map 21 Map showing movement of animals from Kheria haat (Block Korha, of Katihar district) market to Kusida livestock market of Malda district in West Bengal .(A- Kheria Haat, B-Manshahi, C- Manihari, D-Amdabad, E-Kumedpur)

Two complete in-country animal movement routes in Northern Bihar are shown in Map 21 and 22.

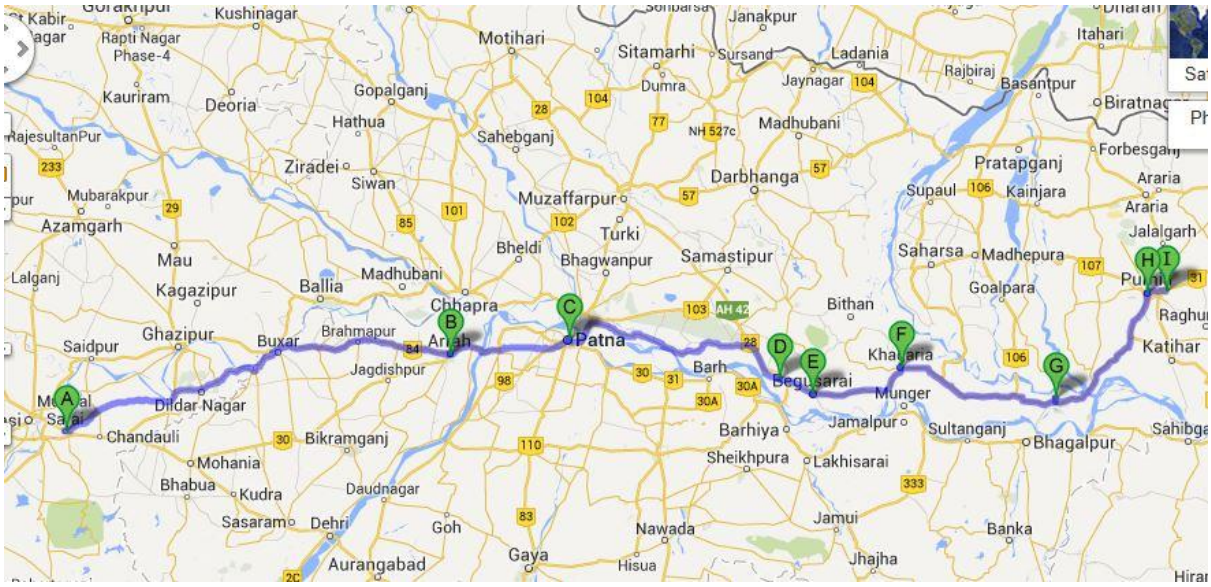


Map 22 A-Bagha B- Bettiah C-Sugauli D-Motihari-E-Pipra Kothi , F-Motipur G-Muzaffarpur H-Darbhanga I- Supoul J-Araria K-Kishanganj



Map 23 A Narkatiaganj, B- Sikta, C- Raxaul, D-Adapur E- Ghorasahan, Kadamwa F- Bairgania G- Sitamarhi, H- Madhubani, I- Sakri J- Supaul K-Araria L-Kishanganj

The other major in-country routes where west to east movement of animals can be observed are: NH-2 (G T Road) and the route from Mugal Sarai to Purnia via Patna, Barauni as shown in Map 23.



Map 24 Alternative in-country route from UP to Purnia in Bihar touching NH 31. A – Mugal Sarai B-Arrah C-Patna D-Barauni E- Begusarai F- Khagaria G-Naugachia H-Purnia I- Gulabbagh

Analysis of these reports and logical reasoning indicates the limited scope for observation of cross border movement within the border areas. However, since the majority of animals crossing the border takes along the in-country route to West Bengal, following location within the in-country route(s) (in the context of north Bihar) potentially suitable sites for setting up of check post(s) to monitor animal movement or to ensure vaccination of transported animals. This observation points are likely to cover at least 60 percent of animal traffic from UP to West Bengal via various bordering districts of North Bihar with Nepal.

- Dalkhola (N 25052’58.9’’ E 087049’17.1’’)
- Taiabpur More (N 26023’17.1’’ E 088089’39.9’’)
- Bilauri (N 25045’59.0’’ E 087030’54.7’’)
- Bahadurganj (N 26014’46.8’’ E 087049’51.7’’)

It is beyond the scope of the study to record observation points for animals entering the West Bengal from distant states like Gujarat, Rajasthan, Madhya Pradesh, Andhra Pradesh, Punjab, and Haryana etc. via Jharkhand, Orissa and South Bihar.

West Bengal:

Analysis of data indicates movement of cattle, buffalo and small ruminants to West Bengal from Bihar, Jharkhand and Orissa. Most of these animals destined for Bangladesh reach large scale livestock markets in 5 administrative districts viz. Birbhum, Burdwan, Bankura, Medinipur and Hoogli (See red button in Map 24) in southern West Bengal. All the 9 bordering districts (See green button in Map24) with porous international (including riverine) border is witnessing lesser or higher degree of cross-border illegal movement of livestock (mostly cattle) to Bangladesh (See table 1).

Map 25 In-country cattle movement, livestock market concentration and bordering districts of West Bengal with Bangladesh

Table 1 Illegal cattle trade in Indo Bangladesh border

Year	Number of cases	Cattle head seized	Number of smugglers apprehended
2010	6633.	101381	287
2011	7199	135291	411
2012	11998	120724	395
2013 (till Nov)	14097	115351	396

Source: Ministry of Home Affairs, GOI Lok Sabha, Starred Question No.76 dt.10.12.2013.

High demand of beef (in-country and export) and growing market of by-products e.g. leather, ceramics etc. in Bangladesh is the key driver of this movement. The geographical terrain, involvement of anti-social elements, political constraints arising out of need for maintaining bilateral relations and *modus operandi* of illegal trading as recorded by Indian law enforcing agencies (Source : interview with BSF officials) indicate that it is difficult to prevent such trade. FGDs conducted at various places indicated that, there is not any fixed movement route for illegal trade and most of the cross-border movement is taking place on foot through large number of bordering villages. Published news reports (*Misra Manjari* "Illegal cattle funding terror" Times of India, Oct 3 2008, See annexure XVI) quoting independent sources indicate 68 smuggling corridors and 149 sensitive villages in West Bengal and Bangladesh border areas. Data sourced from ministry of home affairs, government of India indicate 23 vulnerable Border out Post (BOP) in Indo-Bangladesh border (See table 2)

Table 2 23 most vulnerable Border out Post (BOPs) in Indo Bangladesh Border

Sl.No.	Frontier	Sector Head Quarters	Border Out Posts
1	South Bengal	Kolkata	Ghojadanga
2	do	do	Panitar
3	do	do	Sodepur
4	do	do	P J Nagar
5	do	do	Khalsi
6	do	do	Amudia
7	do	do	Haridaspur
8	do	do	Angrail
9	do	Behrampur	Harudanga
10	do	do	Kaharpara
11	do	do	Nirmalchar
12	do	do	Rajanagar
13	do	do	Singhpara
14	Malda	Malda	Sovapur
15	do	do	Churiantpur
16	do	do	Daulatpur
17	do	Raiganj	Bhimpur
18	North Bengal	Jalpaiguri	Changrabanda
19	do	do	B S Bari
20	do	Falakata	Fulbari
21	Guwahati	Coochbehar	Gonapara
22	do	do	Kalamathi
23	do	Dhubri	M M Char

Source: Ministry of Home Affairs, GOI Lok Sabha, Starred Question No.76 dt.10.12.2013

Considering existence of multiple cross-border routes, it can be safely concluded that systematic movement control or disease check is not possible at the bordering areas and attempts need to be made to record prominent in-country routes that feed such cross-border trading. The study could not identify such in-country routes in details considering limited access to detail data from BSF on sensitive movement corridors. The major routes for entry to West Bengal from Jharkhand are: GT Road (NH2) via Panagarh; NH 114A from Dumka via Rampurhut and Dubrajpur. Animals from Orissa are entering markets in Medinipur district via NH 60.

Collated data from various in-country livestock markets in districts viz. Birbhum, Burdwan, Medinipur, Bankura, Hoogly etc., indicated following in the context of animal movement:

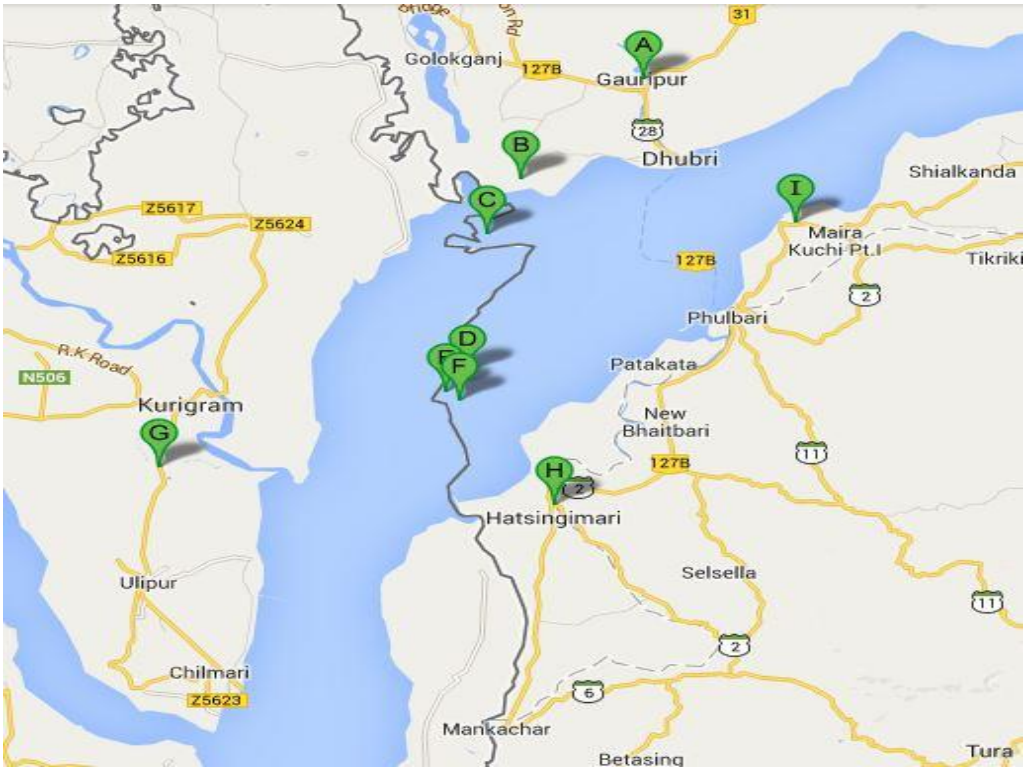
- There is major in-country movement of cattle to West Bengal from other parts of the country. This includes distant states like Gujarat, Rajasthan, Madhya Pradesh, Andhra Pradesh, Punjab, and Haryana etc. Animals are mostly entering through Jharkhand, Orissa and South Bihar. The movement is relatively more during the winter months of the year.
- Animals from various livestock markets in southern West Bengal such as Illambazar cattle market, mostly moves towards markets and various bordering villages of North 24 Paraganas district. Some movements can also be recorded to Nadia district. Animal movement is found to be negligible towards Murshidabad during study month e.g. November-December. Movement towards Murshidabad district can mostly be observed during rainy season).
- The study could not record animal movement from North Bihar districts to markets in South West Bengal.
- Live buffalo movement can be observed from markets in southern West Bengal to processors in Aligarh, Unnao, Barabanki etc. There is unconfirmed report of slaughtering and processing of buffaloes in Kolkata for onward supply to buffalo meat exporters in UP and Mumbai. Live buffaloes are also traded to Bangladesh mostly during rainy season.
- Most of the markets in southern West Bengal operate on multiple days in a week. The volume transaction estimated for Illambazar market where trading takes place throughout the week (with majority trading on Fridays and Saturdays) is around

30,000 animals per week. This reflects the quantum of animal movement that are taking place.

The animals from Nepal are also entering West Bengal in India directly for cross-border trade with Bangladesh. The main route identified in this regard is Kakarvitta – Naxalbari –Galgalia –Bhadrapur – Panitanki.

Assam:

Analysis of field data indicated prominent cross-border movement routes from Gauripur market in Dhubri district to Kurigram in Bangladesh. Map 25 shows places in this route viz. Gaspara (B), Patamari (C) Salapara Pt1 (D), Salapara Pt 2 (E), Salapara Pt. 3 (F), South Salmara (H) and Fakirganj (I) and Kurigram. Different *char* (riverine) areas viz. Matirchar, Sealdachar etc. are being used as major halting points before animals are made to swim shallow rivers in order to cross to Bangladesh.



Map 26 Prominent cross-border animal movement routes in Dhubri (Assam)

KII's conducted in parts of Dhubri district indicated one market in Meghalaya viz. Rajabala as source point for animals from Meghalaya state of India that enters South Salmara (point H in Map 25) of Dhubri district in Assam. These animals then take the route mentioned above

to cross international border. The village in the stretch of international border near Mankachar are also witnessing relatively lesser degree of cross border movement of animals.

The data collected from Karimganj indicate following cross-border routes especially under Patharkandi and Nilambazar administrative division.

- Nilambazar to Gandhai to Baliya border
- Mullaganj to Bilbari border
- Mullaganj to Dhalcherra border
- Patharkandi to Lakhipur border
- Chandkhira to Lakhipur border
- Fakirabazar to Baropunjee border
- Asimganj to Dhalcherra or Nayagram

There are secondary reports that stretch of the river Kushiara in Katigora administrative division (more particularly Pirnagar) under Cachar district and northwest Karimganj district are being used as embarking points for illegal / unrecorded cross-border movement of cattle via river route.

Field data collected indicated that most movements are taking place from Katigorah market to Bangladesh via Umkiyang (Meghalaya) border. It is to be noted that the oldest popular route in Bhanga sector was closed after fencing.

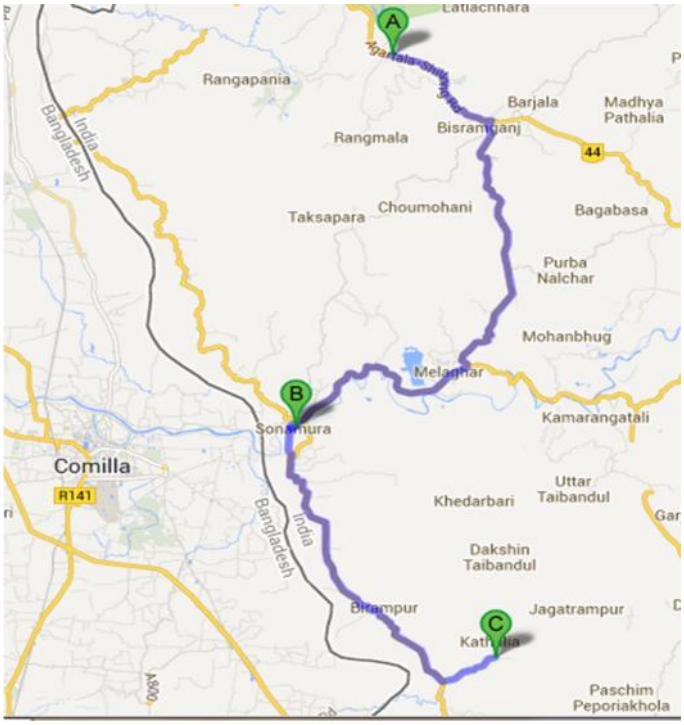
Tripura:

Analysis of data indicates porous areas of Sonamura (Tripura, India) –Comilla (Bangladesh) border as the biggest cross-border trade route for cattle from Indian side. The NH 44 from Karimganj in Assam crossing places like Nilambazar, Patharkandi, Panisagar, Pecharthal, Kumarghat, Kulai, Teliamura, Bisramganj, Melaghar up to Sonamura is the prominent in-country route (Refer Map 26) for livestock movement. A number of cattle markets are on this route and data indicate flow of animal movement directed toward markets in Melaghar and Sonamura.

Map 27 In-country livestock movement route from Karimganj (Assam, India) to Comilla in Bangladesh via Tripura

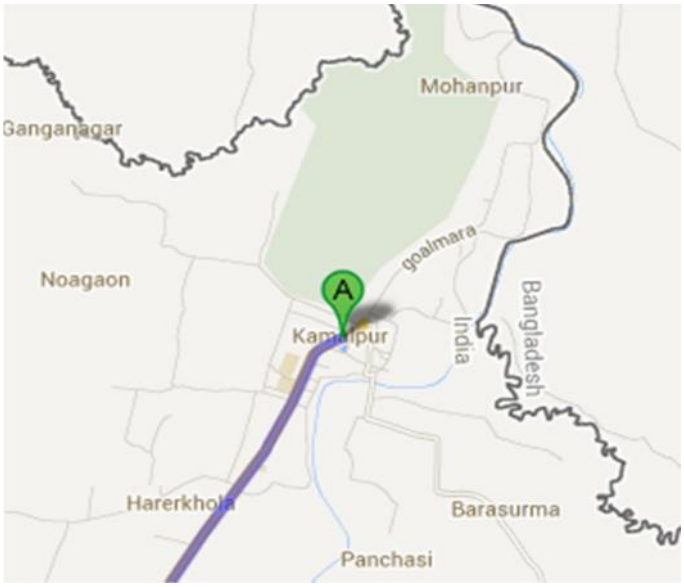
Some of the prominent cross border routes with observed livestock movement which can be considered for setting up of check post district wise are as follows.

Sipahijala district: The route from Kathalia, Sonamura to Charilam



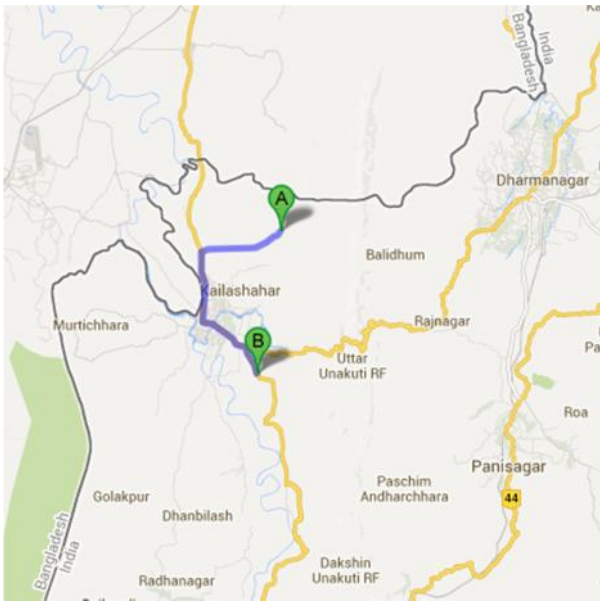
Map 28 Prominent cross-border livestock movement route in Sipahijala district of Tripura

Dhalai district: The route from Kamalpur (bordering with Bangladesh) to Kulai crossing Manik Bharder, Halali, Chalama.



Map 29 A prominent cross border livestock movement area in Dhalai district of Tripura

Unakoti District: The route from Irani to Gournagar via Tilgoan, Kailashar



Map 30 A prominent cross border livestock movement route in Unokoti district of Tripura

South district:

1. Radhanagar to Barapathari crossing places like Puran Rai Bari, Rajnagar, Jardhan and T R Forest.

2. Dulubari to Laugang
3. Sarashimil to Laugang via Belonia

Khowai district: The route from Khowai to Teliamura

Map 31 A prominent livestock movement route from Khowai to Teliamura of Khowai district, Tripura

Analysis of data on Indo Bhutan livestock movement:

The study focused on collecting field data in the context of following 9 known trade routes between India and Bhutan.

1. Phuentsholling (Bhutan) - Jaigaon - Hashimara (NH 31)
2. Sarbang (Bhutan) - Ultapani - Bishmuri (Kokrajhar district, Assam) NH 31
3. Gelephu (Bhutan) - Dadgiri -- Runikhata - Samthaibari (Chirang district) NH 37
4. Panbang (Bhutan) - Mothanguri - Bansbari- Barpeta Road (Baksa & Barpeta district, Assam) NH31
5. Nganglam (Bhutan) - Daodhara -(NH 152) -Pathsala (Baksa & Barpeta district, Assam) NH31
6. Samdrup Jongkhar (Bhutan) - Daranga Mela - Rangiya (Baksa & Kamrup district, Assam) NH31
7. Bhutiachang -Paneri - Tangla - Mangaldoi (Baksa & Darang district, Assam) NH 52
8. Dirang to Bhutan border in Arunachal Pradesh
9. Tawang- Lumla - Bhutan border in Arunachal Pradesh

It is a religious taboo in Bhutan to slaughter live animals for meat. Field data confirmed the fact that there is no organized movement of live animals to Bhutan from India.

There are normal markets on both sides of the border at Phuentsholing (Bhutan)-Jaigaon (India), Gelephu (Bhutan) - Dadgiri (India), Nganglam (Bhutan) - Daodhara (India) and Samdrup Jongkhar (Bhutan) - Daranga Mela (India) where pork, mutton and beef is available. The markets on the Bhutan side are organised with proper facilities and are monitored by their authorities. Animals are slaughtered and cleaned on the Indian side and the vendors then supply meat to these markets.

It has been observed that Bhutanese Government maintains a strict vigil on the animal movement across the known border check posts. However, in many places domestic cattle from the Indian side do cross over through porous borders. One notable observation in this regard is movement of bullock carts that are being used to carry illegally logged timber on the Bhutan border to the places in Indian side.

Description of Livestock Market System:

Delimitation

From the point of view of primary marketed produce, livestock market system or value chain in the context of India can be broadly classified as: Milk Value chain and Meat Value chain. A physical livestock market serves both the chains.

Review of data indicates that the key driver of cross-border and in-country livestock movement in India is the increasing demand for meat (both for domestic consumption and export). Livestock for milk production and draught purpose are also traded in known state level and local markets but movement of such animals are mostly restricted to nearby areas.

Since the risk for TADs transmission (Annexure VII) is linked mostly to livestock movement, it was decided to delimit livestock value chain in the context of the current study focusing only on the livestock meat sector in general and live animal trade in particular.

However, it is to be noted that large animal meat sector in India is primarily dependent on supply of un-productive dairy animals and as such the production system for meat and milk is largely similar in case of large animals.

The livestock market sub-systems and TADs control points.

Secondary information, reference to HS code list of animal products for export (Annexure: II) and data collected from various interviews were collated to describe following sub system wise livestock meat value chains in India.

Sub system A: Production sub-system

The sub-system consist of four types of producers' viz. traditional / backyard dairy and other animal farmer, commercial dairy and other animal (goat, sheep and pig) farmers, farmer agents fattening male animals for meat and nomadic pastoralist. Fig-8 depicts the flow within the sub-system with support structures.

The production setting in each type of producer is unique. Whereas voluntary participation in vaccination initiatives can be expected from commercial units, mass sensitization and focused extension support will be needed to ensure the same in the case of backyard farmers. Nomadic pastoralists are generally ignored in public funded vaccination programmes. A detailed analysis of social hierarchy, indigenous knowledge and husbandry practices of these

communities (including seasonal movement patterns) will be essential to strategize vaccination initiatives.

The relationship and flow as shown in the Fig-8 indicates contractor (leader traders) supplying to major certified abattoirs as the most influential and as such appropriate stakeholders for initial engagement in the context of participatory TADs control. Any message /practice accepted / adopted by this group is likely to flow downward in the chain with passage of time. Procurement managers of major certified abattoirs, who are in constant touch with these contractors, can help in bridging the trust deficit that exists amongst contractors (leader traders) and government agencies.

There are large numbers of small and large commission agents in livestock markets, production clusters and in international border areas. The commission agents in markets and specific production / consumption clusters are responsible for purchase and delivery of live animals based on fixed per animal commission. The agents may or may not work with a single trader and there are also group of agents. Agents also employ people to do various activities related to purchase, delivery etc. The job of commission agents in border areas also includes building relationship with authorities for corrupt practices. Actual traders (investors or owner of animals) rarely visit livestock markets or to farmers' places and as such are difficult to locate. Agents interviewed in Illambazar market of West Bengal indicated that in many cases they buy animals as truck load and divert them to destination indicated by client trader before the animals can be traded in livestock market. This is important in the context of documentation of arrivals in market places and formulation of appropriate communication strategy or to reach out to traders.

Animal transporters shown as support system actor in Fig 8 many a time operate as independent actors that receive only directions from client traders to collect or handover transported animals to specific agents of live animal trader in different locations. The transporters are usually not aware whether animals being transported are diseased or not. The likely death up to a fixed number of animals on transit is built into the contract with the trader. The dead animals are generally disposed of en-route without following any scientific procedure. It is highly unlikely that an independent transporter will take the risk of loss to trader for any police actions on road but transporters skills in anticipating police actions and "managing" authorities is a criteria sought after amongst the transporters. Live animal

transporters are another important stakeholder in the value chain in the context of risk communication and engagement in the context of TADs control.

A critical part of this sub system is illegal trading of live dairy cattle, buffaloes and frozen beef to Bangladesh by numerous traders. The traded animals enter Bangladesh's meat value chain. The modus operandi of the trade is depicted in Fig.11. The trade has resulted into massive in-country movement of animals from west to east thus posing a serious threat to the spread of TADs within the country and across borders. The growing cost of rearing of less productive animals was identified by informants as the root cause for dairy animal entry to meat value chain. Unscientific feeding practices were highlighted a as key reason for short productive life of high yielding dairy animals. The *modus operandi* as depicted in Fig 11 indicates that traders / agents in bordering areas are very influential players. Key informant interviews in various places indicated that these traders / agents mobilize resources from multiple sources and have developed strong network across the country. The traders / agents receive active cooperation from some of the villagers in bordering areas as trade benefits them financially. It is to be noted that traders pay rent to many villagers for temporary holding of animals within their premises prior to illegal shipment to Bangladesh. FGD questions pertaining to possible innovative solutions to stops or minimise demand driven illegal trade of cattle, indicated the need for legalization of trade and enhance investment to augment sustainable dairy farming in areas known as supply source for such trade.

I belong to a village near Bongoan in 24 North Paragana district of West Bengal. Trading of cattle is our family business. We are very poor till the other day when our father who migrated from Bangladesh started the business. The cattle trading to Bangladesh have brought prosperity to our family. Today we have land, houses besides trucks used in trading. We supply 250 to 400 animals per week to Bangladesh. We have engaged agents in various markets and also regularly keep track of prices. Presently buying rate of cattle in West Bengal market is around Rs.5000 -6000 (91-109 US$ to per maund (~40kg=1 maund) of estimated carcass weight. The selling price to traders in Bangladesh which is fluctuating and based on internal demand and also value of US $ is from 7000 to 7500 (127-136 US$) per maund. The prices go up during festive months.

Nando- a trader

The predominance of road side slaughter of small animals is a deterrent to effective functioning of municipal abattoirs. This has a relevance to disease spread as ante mortem

examination for diseases in slaughtered animals by qualified personal is only possible in organized abattoirs.

Sub system B: Processing sub-system

The sub-system indicates four prominent players' viz. private abattoir with mechanized meat and rendering plants (certified for exports), private manual / mechanized meat processing plants and local Municipal abattoirs and independent further processing units. The majority of India's largest meat-processing facilities are located in just 28 cities and towns. A few of the large integrated units have made investments on feedlots / own organized farms. Fig 9 depicts the product flow within this subsystem with support structures.

A critical analysis of the relationship in this sub-system indicates a strong business focus. Stakeholders in this sub-system are likely to approve / participate in government initiatives aimed at setting up of disease controlled / disease free zones. Analysis of stakeholder interviews conducted within this subsystem indicated the following in terms of market dynamics and chain governance with relevance to disease control:

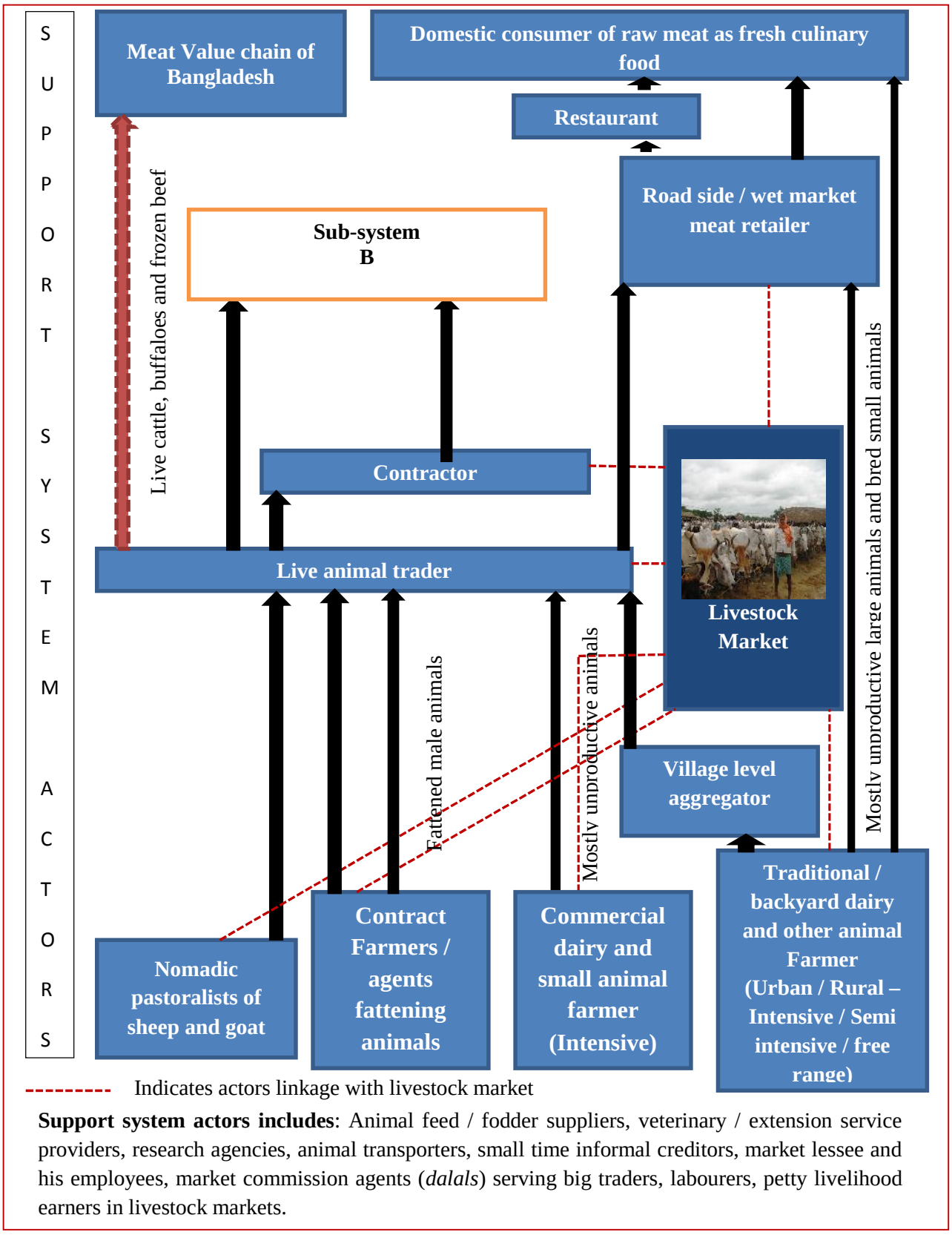
- Capacity unitization of abattoirs and meat plants are directly dependent on contractors for regular supply of buffaloes and small animals. With high export market demand and domestic competition from increasing number of abattoirs, companies are forced to maintain good relationship with suppliers / contractors. Many a time companies had to relax norms (e.g. acceptance of animals known to have originated from distant places) and standard process of screening animals before procurement.
- A number of companies are strategically making investments on networking and relationship building with big traders to ensure their loyalty if not reduce animal procurement cost. This growing relationship is beneficial in terms of disease control as same will not only help organize supply sector but also force supply side actors respond to exporters requirement of disease free and traceable animals in the long run.
- A few meat exporting companies are in the process of making investments in setting up of own farms (Feedlots). The success of such endeavours will however, depend on the production efficiency of such farms and export market incentives for traceable disease free factory meat. The success of the endeavour can enhance the bargaining power of companies to force contractors for supply of disease free or vaccinated

animals. It will also greatly reduce animal movement from distant places to large abattoirs.

Sub system C: By-products.

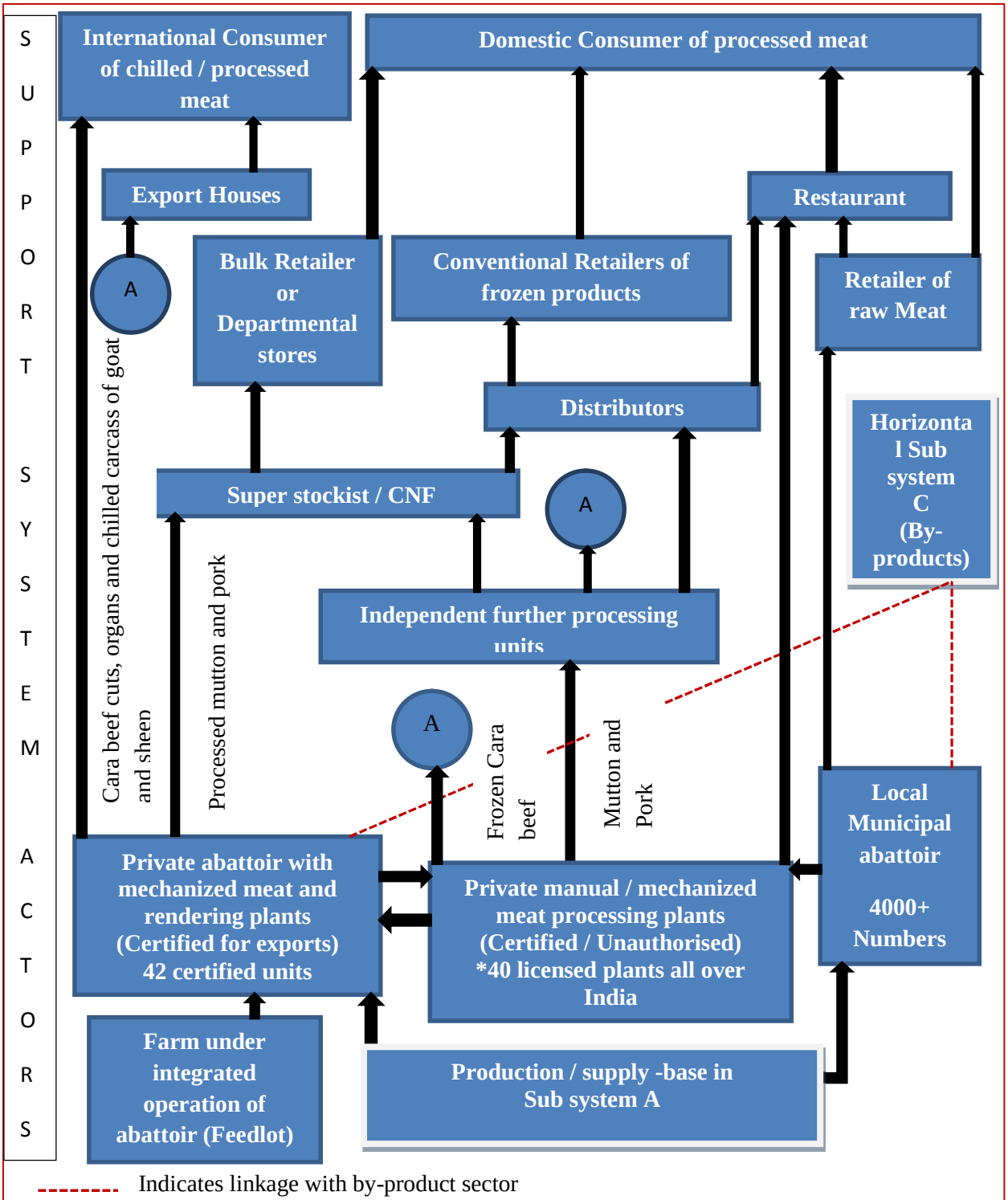
The subsystem indicates numerous players dealing with by-products. Fig 10 depicts the product flow within the subsystem. The most critical control point in this sub-system is the aggregator of hides, skins, horns and hooves. Long distance movement of raw hide, skin, horns and hooves by aggregators can be a potential reason for disease spread. Rendered offal, bones that enter the food chain directly and indirectly justify public investment on scientific assessment of technologies used, and processes adopted vis-à-vis safety of final products developed.

Picture 3 Glimpse of different other value chain players in a livestock market e.g. a vendor selling colourful plastic ropes used to adorn dairy animals to be sold in the market for sale, experts decorating horns and shoeing an animals etc.



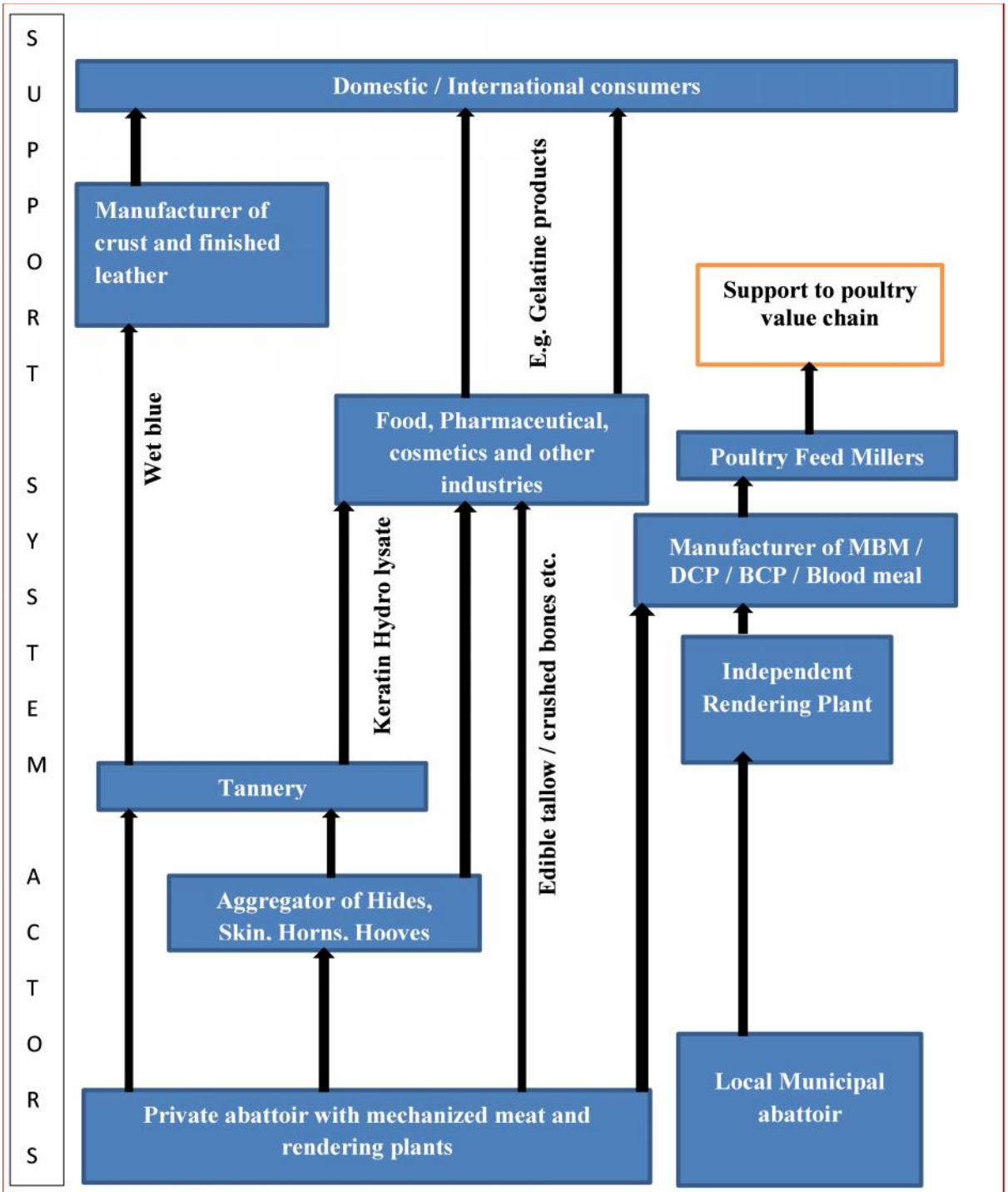
Support system actors includes: Animal feed / fodder suppliers, veterinary / extension service providers, research agencies, animal transporters, small time informal creditors, market lessee and his employees, market commission agents (*dalals*) serving big traders, labourers, petty livelihood earners in livestock markets.

Figure 8 Livestock meat value chain in India under Sub-system A (production sub system)



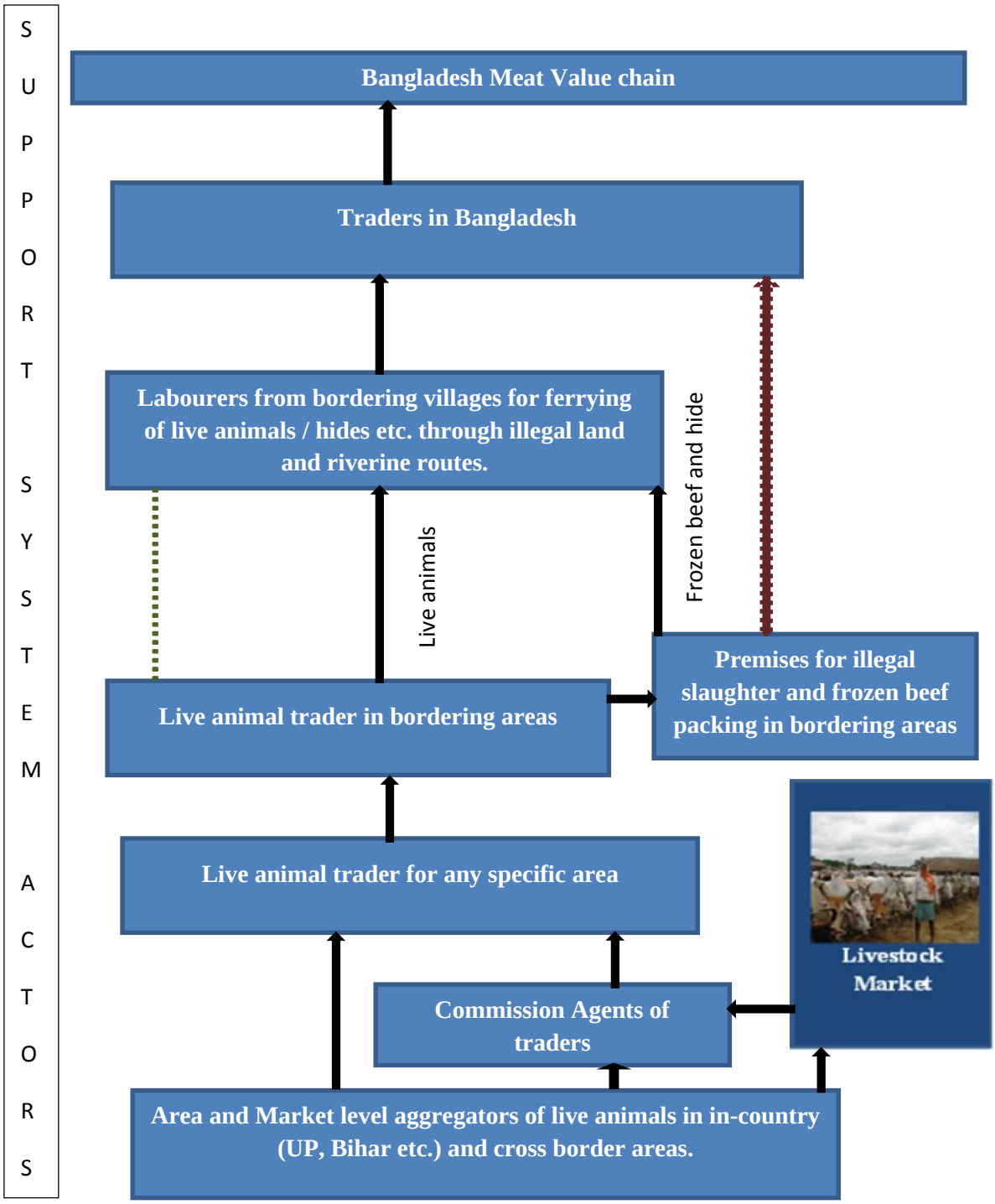
Support system actors includes: R& D institutes in food processing and packaging, industry associations, transporters, slaughter house equipment and machinery manufacturers / suppliers, veterinarians, project management consultants, commission / clearing agents, banks, meat or quality control inspectors (Govt. / Private) , slaughter house employees (skilled / unskilled) and labourers.

Figure 9 Livestock meat value chain in India under sub system B (Processing sub-system)



Support system actors includes: R& D institutes in leather technologies, commissioned / clearing agents etc.

Figure 10 Livestock meat value chain in India under subsystem C (By-products)



Support system actors includes: Brokers (who connects complicit authorities) illegal investors / syndicate, anti-social elements and transporters.

Indicate un-confirmed illegal export of frozen beef through formal cross-border routes.

Indicate instances of group of labourers acting as traders.

Figure 11 Modus operandi of illegal livestock trade

Primary data analysis:

Analysis of qualitative data from FGDs and KIIs and analysis of primary data collected through schedules were collated to establish the following. It is to be noted that the total number of validated schedules from traders used for analysis is 75 only in contrast to farmers which is 150. This is due to the fact that identification of real trader for interview was extremely difficult as many people poised to be trader are actually commission agents. Moreover, interview with small village level aggregators using the schedule meant for trader was not considered for analysis for want of more clear understanding of characteristics of actual traders who should be targeted for risk communication. It is to be noted that, answer to few questions included in the schedules (more particularly to the one related to volume of trade by informant trader) could not be recorded in majority of cases as respondents were neither interested to answer queries nor could they recall data specificities in terms of the number of animals purchased or sold.

- Livestock trading is mostly a family business. A member generally enters in to the profession around 15 years of age and by 25 years he becomes a master in the trade. The mean experience of the surveyed sample is 6.53 years. The livestock trading profession in India is dominated by middle aged mostly uneducated males belonging to the minority Muslim community. The per cent respondent belonging to aged group (30 years+) in the sample survey 78 %. It is to be noted that, people of different ages have different needs when it comes to understanding risk. Older adults are less likely than other age groups to understand risk. Understanding the meaning of a particular communication is crucial for older adults. This indicates need for planned disease risk communication strategy to reach out at livestock traders in particular and farmers in general.
- The majority of traders (73%) are 2nd or 3rd generation traders. High 2nd or 3rd generation traders indicate permanency and exclusivity of the trade with relatively high entry and exit barrier. This also indicates the chance of more organized activity and consolidation of business in the long run making it relatively easy for authorities to ensure safe and formal in-country and cross-border livestock trade.
- Livestock trading is a skilled job and requires good understanding of animal behaviour, age estimation vis-à-vis likely meat yield. As high as 95 % traders within

the sample were found to trade on large animals (cattle and buffaloes) in comparison to small animals (sheep, goat and pig). A negligible percentage (0.04 %) of traders opted for multiple animal trading. This finding corroborates with qualitative data which says that species specialization is common in live animal trade. The finding is of relevance in the context of designing of sensitization and capacity building programmes for stakeholders in live animal trade.

- Live animal traders in India generally do not trade on livestock supplies like feed and medicine. There are however state level variations. A negligible (1%) percent of traders deals in feed and medicines. As far as livestock products are concerned, however, up to 65 % of traders deal in livestock products (54% in meat and 34% in Milk). This finding corroborates with finding of qualitative survey which indicated that livestock trading is increasingly becoming full time skilled business and diversification to related trading e.g. farm supplies is negligible. This finding is of relevance in the context of planned intervention to organize livestock trade in long run.
- Livelihood of 17 % of surveyed respondent of traders depends entirely on trade of live animals. Qualitative data indicates that very few established traders have diversified their trading activities both in related and non-related activities. An approximate 15 % of traders (qualitative assessment only) who are in hide business are also live animal traders. Within the livestock trader community, there are specialised people accordingly to species of animals. Trader with all animal specialisation is reducing day by day.
- Qualitative data indicates that partnering for resource sharing and forming informal cartel to influence price is common in livestock trading activity. The business is slowly getting organised in India. However, only 9% of respondents indicated partnership in trade. This indicates more confirmation is needed to establish the finding of qualitative analysis. More partnership will justify engagement and investment on livestock traders for organized and safe trade in future.
- A majority (83% of survey respondents) of traders operate on a state basis. As high as 16% of respondent traders indicated bordering areas as their trading area. Qualitative data indicates that most of the traders in any particular state maintain good relationship with traders across the country and traders from bordering nations. This

indicates the need for a coordinated multi state approach across major routes to check the spread of diseases in transported animals.

- Based on volume of trade, a livestock trader is generally assisted by his employees who look after purchase, animal handling, transport and implementation of contracts for supply etc. Sample data indicates that a trader employ in an average 4.3 number of persons.
- Occasional holding of animals that are sourced from different areas takes place near big livestock market areas a day for two before market day. The animals that do not get sold in a market day are either held in the market place or taken to nearby villages. Qualitative data collected from various markets indicate that usually animals received in a market get sold within 2-5 days. Holding period (pre-market) depends on number of aggregated animal vis-à-vis capacity of available transport vehicles. It is to be noted that a majority (46%) of such holding areas are community places and can be identified by local authorities for compulsory pre-market vaccination instead of vaccination in busy livestock markets.
- A relatively small number of traders (21 %) have own farm or male fattening unit. The trend of live animal traders maintaining farms or fattening unit is likely to emerge in future with possible supply constraints, political risk and export market requirement. Qualitative data indicates instances where traders are giving advances to farmers to fatten male animals. However, the sample survey of both farmers and traders failed to establish the same.
- Livestock markets are the biggest source of procurement for trader (64%). Interestingly as high as 26% procurement is directly from farmers' door step. Qualitative data indicates presence of large number of agents of big traders who does rural procurement on behalf of the trader. Up to 9% of interviewed traders indicated other traders or aggregators as source of procurement. Aggregators or small time traders collect animals from farmers door step and even give advances to farmers for same. The finding indicates active role of agents and importance of local aggregating small traders in the supply chain at the village level. It will be beneficial to engage with them as far as risk communication and delivery of extension message to farmers are concerned.
- It is common for a trader to visit multiple markets (73% of surveyed traders) and as such he has limited means to keep track of source of his traded animals. Most animal

traders (68% of respondents) tend to sell purchased animals to other traders from distant areas or contractors via supply contracts with known abattoirs. This finding confirms the fact that long distance movement of traded animals is common.

- Most big traders possessing supply contracts with meat exporting companies or engaged in long distance trade of animals maintain their own fleet of vehicles. Data of the sample survey which is biased at small state level traders however, indicated that majority of traders (74%) rely on hired vehicles if not transporting their animals on foot. It is to be noted that vehicle used for transport of animal in India are not designed exclusively for animal transport. Secondary information indicates that in India, practices linked to animals transport are largely unscientific and unethical and these may contribute to disease spread. The current study could not assess the knowledge, attitude and practices (KAP) of animal transporters. Such learning is essential to communicate disease risk and to engage with transporters or to design incentive scheme meant at promoting designed vehicles for animal transport.
- As high as 47% respondent traders could not name any animal disease. This indicates that the awareness and risk perception is very low. It is unlikely that, traders will value the importance of vaccination against diseases unless they are forced or receive market premium on sold vaccinated animals. It is to be noted that up to 34 % respondent traders indicated interaction with veterinarians. A good percentage of farmers (70%) however, indicated interaction with veterinarians and animal health workers.

Review of production system in cross-border areas:

Qualitative data indicates limited intensive livestock production cluster near cross-border areas with Nepal, Bhutan and Bangladesh. This is good in the context of TADs control. There is predominance of farming with confinement (complete and semi confinement) of animals (72% of surveyed farmer respondents). The husbandry practice was found to be relatively safe in the context of disease risk and there are no cases of rearing of captured feral or wild animal. Up to 72% of respondents could elaborate on prevailing diseases. Amongst those who could elaborate on diseases, 63% indicated vaccination as preventive measure. This finding may indicate demand for vaccination. The average herd size of respondent farmers was 7 for large animals and 5 for small animals. The feeding system is largely

traditional. Majority of respondents (58%) in the sample survey indicated ignorance about feeding of branded compound feed. Membership in milk cooperatives or self-help group (SHGs) was very limited (only 1% of respondents). Absence of farmer institutions may be a bottle neck for agencies to ensure last mile service delivery including vaccination. FGDs conducted with farmers recorded low productivity of animals and high cost of feed / fodder as prime reason for failure of dairy farming in most of the bordering areas. It can be assumed that, failure of dairy farming is one of the major causes that have led to a surge in cross-border movement of unproductive dairy animals for meat (a means of culling for many farmers).

Analysis of market intelligence reports:

Collation of market intelligence data collected from visited in-country and cross-border markets in all the 5 study states indicates the following in the context of animal disease control:

- There is ample scope of organizational improvement of market institutions viz. market committees, lease owner, trader groups etc. Improvement of visibility, governance of these institutions will greatly help in implementation of bio-security rules and in ensuring participation of all stakeholders in disease reporting.
- There is slack implementation of local government rules pertaining to compulsory registration of livestock markets. Stakeholders informed that new markets are coming up without the notice of concerned authorities. New livestock market by private players in own or rented land was recorded in Sitapur district of UP during the study period (See picture 4). Proper registration and database of livestock markets is crucial element for law enforcing agencies to monitor activities and ensure disease surveillance.

Picture 4 Private advertisement regarding opening of new livestock market.

- There is need for infrastructure improvement in almost all markets. Some of the critical infrastructures are loading / un-loading ramps, entrance road, facilities for public amenities and disposal of dead animals. Partial public funding of market infrastructure was advocated by number of informants as same will help in building trust between government agencies and market committees. The market area near loading and unloading ramp (Fig 5) can be identified as an appropriate place for effective disease monitoring of animals entering or going out of the market. This area is also important for overseeing cleaning and disinfection of vehicles used for transportation.

Picture 5 An animal loading ramp in one of the largest livestock market in UP

- There is inadequate implementation of operating procedures for transparent trading. Visibility of market committees are negligible in most of the cases and is restricted to issue of purchase receipts only. Many farmers and traders interacted during market

days were found to be ignorant of role of the market committees or owners except collection of fees. The situation is indicative of poor communication and leadership on the part of market management and same is not conducive for participatory actions aimed at disease control.

- There is a predominance of informal financing and lack of banking support. A number of traders interacted with opined their apprehensions regarding cash transactions. Access to banking and other formal financial services can be an integral component of incentive mechanism to ensure engagement with traders for participatory implementation of bio-security rules.
- Though there is species wise segregation of holding area in most of the markets, segregation of animals based on place of origin (for bio-security) could not be observed in any of the markets visited. Lack of practice of isolation of identified diseased animals and improper disposal of dead animals (See picture 6) are recorded as prime risky practice in a livestock market. Most the informants indicated need for more pro-active role of market committees and owners in this connection.

Picture 6 A dead buffalo near unloading ramp in a livestock market

- Muddy surroundings, inadequate designated areas for specific activities and unplanned earmarking of holding areas prevents easy movement of people within most of the livestock markets. There is hardly any scope in such markets to make an organized and systematic observation of animal behaviours and disease symptoms by veterinary authorities.

- None of the markets maintain any database on market actors, specific feeding areas (location from where animals are sourced for the market) and destination places. A review of practices indicates that such a database can easily be developed by market committees by streamlining the practice of issue of revenue receipts. A database of place of origin and destination of traded animals can help authorities plan disease control strategies in the event of an observed outbreak.
- Private night holding sheds (on rental basis) around market areas (for animals from distant places) are usually not supervised by market committees/ owners. These sheds are a relatively appropriate place for disease surveillance. Owners of such sheds can be sensitised for voluntary reporting of scheduled diseases.
- There is inadequate display of extension materials within market areas to sensitise and educate farmers and traders on bio-security and preventive aspects of diseases. Although there are in-house veterinary facilities in a few markets, according to the majority of respondents the visibility of veterinary department activities within market areas is largely insignificant. Veterinarians interacted with during the visits highlighted the need of capacity building of veterinarians belonging to the state veterinary departments as competent officer under Prevention and Control of Infectious and Contagious Diseases in Animals Act'2009.

Picture 7 Veterinary facility at Jubairganj livestock market, Faizabad, UP

- Interaction with transporters at various livestock markets indicated poor understanding of impact of stress on animal health, production and spread of animal diseases. This can be linked with the observed risky practice of irregular washing and disinfection of vehicles, use of sedative during transport, improper disposal of dead animals during transport etc.

Estimation of live animal trade volume

As a policy, in India, export of live animals (horses, live cattle and buffaloes, camels etc.) is restricted or permitted only under licence. Data obtained from export import databank of Department of Commerce, Government of India indicates that official live animal trade between India-Nepal, India-Bangladesh and India- Bhutan during FY 12-13 is one sided only. The value of India's official export of live animals (HS code 01) to these countries is Rs. 5,234.34 lac, Rs.68.35 lac and Rs.7.85 lac for Nepal, Bangladesh and Bhutan, respectively (10 lac in the Indian numbering system=1 million). Table 1 and 2 indicate species wise break up of export (HS code up to 4 digits). It is to be noted that India exported only live poultry to Bhutan during FY 12-13.

Table 3 Value of India's official export of live animals to Nepal during FY 12-13

HS Code	Commodity	Value (Rupees Lac)
0101	Live horses, Asses, Mules and Hinnies.	132.95
0102	Live bovine animals	0.74
0103	Live Swine	44.65
0104	Sheep and Goat	4,967.96
0105	Live poultry	73.04
0106	Other live animals	15.0

Table 4 Value of India's export of live animals to Bangladesh FY 12-13

HS Code	Commodity	Value (Rupees Lac)
0101	Live horses, Asses, Mules and Hinnies.	68.19
0102	Live bovine animals	0.00
0103	Live Swine	0.00
0104	Sheep and Goat	0.16
0105	Live poultry	0.00
0106	Other live animals	0.00

Import of livestock and livestock product in India is regulated by the Livestock Importation Act, 1898. The livestock products are allowed to be imported into India only through sea

ports or airports located at Delhi, Mumbai, Kolkata and Chennai, where the Animal Quarantine and Certification Services Stations are located.

Based on analysis of qualitative data it can be concluded that the trade linked policy of Government of India which prohibits the slaughter and export of beef of cows, oxen, calf in one hand and promotion of export of cara beef (buffalo meat) on the other, has led to large scale illegal in-country and cross-border trade of animals in India. The cross-border price differential of live animals arising out of high demand of beef in Bangladesh is further fuelling this illegal trade. The observed multiple sourcing of animals from across the country, their long distance transport for cross-border illegal trade and associated practices are of paramount risk in the context of TADs.

The study could not make any attempt at estimation of illegal cross-border trade between Indo–Nepal and Indo-Bangladesh border as there are numerous movement corridors. The movement between Indo-Bhutan borders was ignored considering the fact that the slaughter of animals is a taboo in Bhutan and hence it is unlikely to find organized movement of live animals between India and Bhutan. Moreover, the terrain, *modus operandi* of the trade (e.g. transfer through riverine routes in small batches preferably at night time) will make data collation difficult. As an alternative, to obtain a general view on quantum of west to east animal movement in study areas e.g. border areas of five Indian states viz. UP, Bihar, West Bengal, Assam and Tripura, the study attempted at calculating the volume of illegal trade within the study area by ways of observing movement in five strategic locations viz. Dalkhola (West Bengal), Taiabpur, Bhadurganj, Bilauri (Bihar) and Melagarh (Tripura) (See annexure-XV) for designed tally sheet for each location) for continuous 7 days in a week. Based on analysis of qualitative data and logical reasoning, it can be assumed that 80% of movement that are taking place in the study areas are actually destined for Bangladesh.

The estimated observed west to east animal movement volume in peak hours in five strategic locations as observed during late November and early December 2013 are shown below. It is to be noted that movement during the observed period was likely to be low considering political disturbances in Bangladesh during the same time. This estimation does not necessarily reflect all the movement in the study area as movement during slack periods are ignored and the fact that there are other routes which are also used for transport of animals via vehicles and on foot.

Dalkhola (West Bengal): 2200 animals per week (observed period: 8 am to 5 pm)

Taiabpur (Bihar): 3005 animals per week (observed period: 10 am to 4 pm)

Bilauri (Bihar): 500 per week (observed period: 10 am to 4 pm)

Bahadurganj (Bihar): 2720 per week (observed period: 10 pm to 6 am)

Melagarh (Tripura): 875 per week (observed period: 12pm to 7pm)

To explore the trend of illegal animal movement further, a detail study of illegal live animal movement related crime records in UP for three consecutive years (2010-up to June 2013) was analysed (Fig 12).

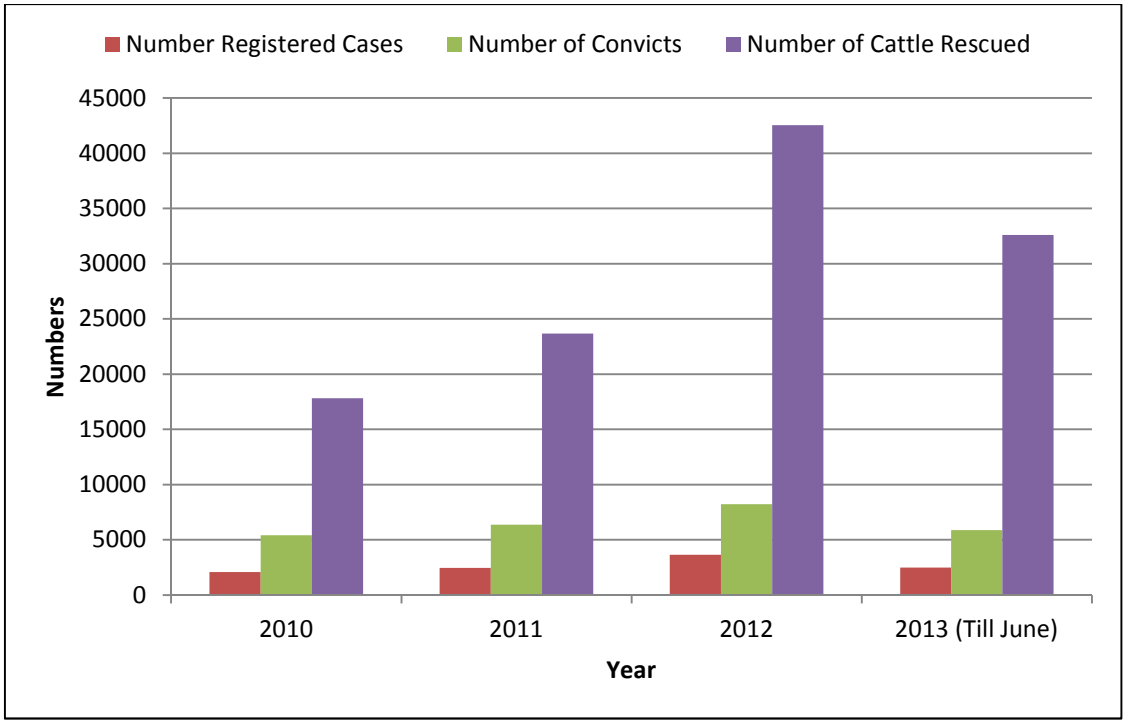


Figure 12 Year wise number of registered cases, number of convicts and number of cattle rescued. (Data source – Government of UP)

The registered cases as shown in Fig 8 are almost same across the year except for a marginal increase in 2012. It should be noted that number of registered cases in 2013 is only for six months (Jan-Jun, 2013). If it is assumed that number of registered cases are uniformly spread over the full 12 months then the number of registered cases and number of animal rescued in 2013 would be significantly high (almost double). The trend for the number of convicts and number of rescued animals are increasing steeply. It is to be noted that data depicted in Fig 12

shows only yearly and half yearly (2013) data. In the absence of monthly or periodical data it is difficult to show the seasonal variation in the trend. It can be expected that during the October and November month of a year (festive season) the figure might be higher than the rest of the year. The increasing trend of number of registered cases and number of rescued animals from 2010 to mid-2013 may be due to increased activity of state police to curb the illegal movement of animals.

To derive a glimpse of seasonal variation in animal movement the monthly data of recorded police cases up to June 2013 were analysed (Fig 13). Findings indicate high number of rescued animals during the month of March which may be interpreted as the month with high animal movement.

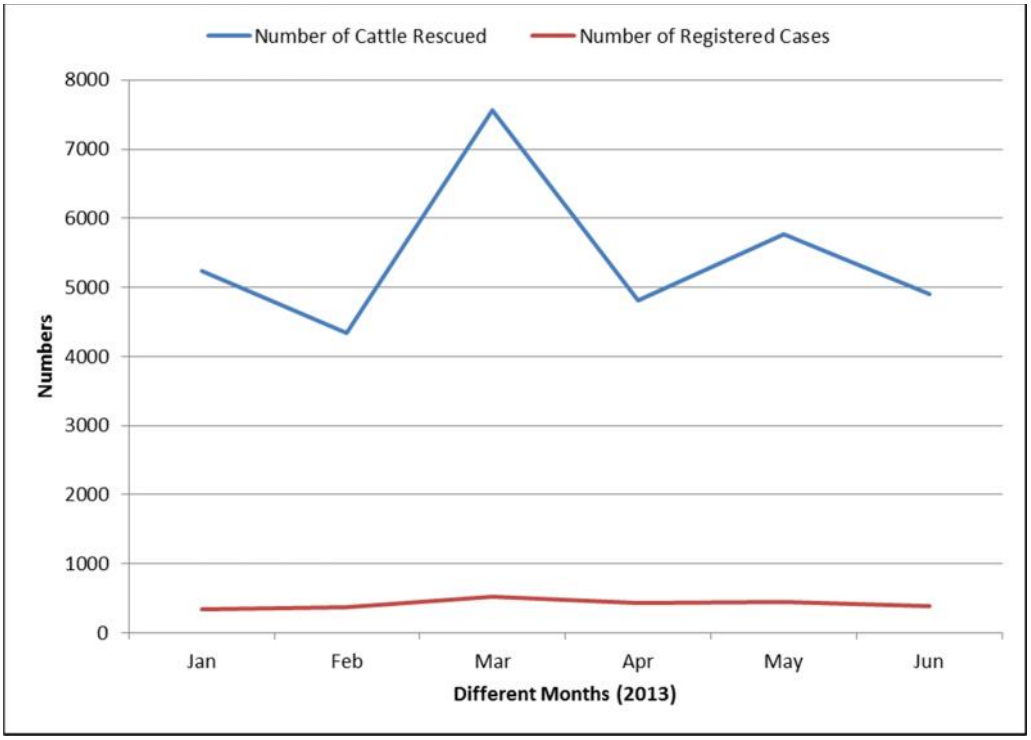


Figure 13 Seasonal variation in animal movement

Recommendations:

The study was undertaken during the short period from June to November 2013. Extensive FGDs and KIIs were conducted across the study areas besides market intelligence data gathering. Attempts at quantitative data gathering using schedule was however, largely unsuccessful. Differentiation between a trader and an agent was the greatest hurdle. Many identified respondents requested for anonymity. In many places, field team could not even mention about the fact that interviews being used to fill up schedules. This was primarily due to sensitivity associated with live animal trade and enhanced on-going government initiative at preventing illegal trade of cattle.

The recorded findings were discussed with the local stakeholders. The consultations helped in listing following suggestions:

Sensitization on law:

Government of India has already adopted the Prevention and Control of Infectious and Contagious Diseases in Animals Act,2009. The Act is currently in force all over India. The gazette notification dated 14th December'2010 of Ministry of Agriculture highlights various rules, responsibility centres and procedures pertaining to the act. The numerous stakeholders, interacted with during the study were mostly ignorant about the provisions of the Act and rules in force vis-à-vis benefits of following the same. It is suggested that, the government should initiate a country-wide programme to sensitize stakeholders about the objective and provisions of the act. The value chain actors in various market subsystems (including that from support system) identified in the current study can help in listing out representative group of people for such sensitization programmes.

Taskforce for animal transportation policy and movement control:

Large scale unregulated movement of animals triggered by market forces is a matter of concern for control of spread of diseases more particularly TADs. Though there are concerted actions by security agencies to prevent illegal movements in various states, same can be further strengthened by constituting a national level task force on animal movement control. The task force could augment consultation for more pragmatic animal transport policy which is friendly to domestic meat industry, takes care of investments for identification of

movement routes, compulsory disease check at quarantine station and protection against productive dairy animals from entering into meat value chain.

Capacity building:

The findings indicate that, it is difficult for government agencies to check demand driven illegal movement of animals through porous borders. Nevertheless, the cross-border livestock trade takes place not only as a result of better price offers than the home markets, but also because of proximity to cross-border. Trade in live animals is also likely to be much greater than trade in meat. This preference has various explanations, such as local traditions for the slaughter of live animals for consumption, and religious festivals that require the sacrifice of animals. A discussion on political constraints, options vis-à-vis suggestions in connection with prevention or legalization of observed illegal trade is beyond the scope of this report. However, considering the observed illegal trade volume and increasing trend of police cases recorded during the study, the issue demands strong actions for enhanced investment and capacity building of farmers institutions like cooperatives and farmer groups in bordering and in-country supply areas so that they are empowered and can collectively decide on scientific culling practices. The discussion with traders and other related stakeholders in the context of disease control indicated the need for a planned awareness drive and innovative engagement with them to check risky practices. Procurement managers of large abattoirs who play a critical role in the value chain can be the key contact point for government to reach out to traders. Similarly attempts should be made to identify actual trader for fruitful engagement as any communication reaching out to agents alone would bring limited results. It is suggested that capacity building programme should be organized to sensitize, augment innovative thinking for strategic communication and to empower procurement managers. It is to be noted that the specific findings of the study on background of traders will be of help in developing required communication tools for traders. The capacity building programme with procurement managers as key change agents will help in participatory engagement with contractors for supply of only certified / ear tagged vaccinated animals. The demand for only vaccinated animals at the top of the value chain will likely to trigger voluntary compliance of vaccination at the farmers or at small traders' level.

Focused surveillance and vaccination:

The tool for identification of risky cross border areas developed as a part of area sampling strategy of the current study may be utilized by the government agencies to periodically score

bordering administrative divisions. The direction of animal movements is dictated by the supply and demand of the marketplace and so can vary considerably. A detailed state-wise GIS based animal movement route map using the designed tools (annexure VI) should be developed and updated from time to time for planned monitoring of the movement, changing trade practices and to set up vaccination check / quarantine posts at appropriate locations. The key movement routes and list of areas suitable for setting up of pilot check post in the study areas as on date has already been identified under the current study. A prioritized and focused surveillance; vaccination programme thus should be initiated across the border areas in collaboration with neighbouring countries. The production system in bordering districts recorded during the study justifies investment to augment sustainable livestock farming as a tool for poverty alleviation. However, as a policy government should discourage setting up of large commercial farms or clusters in bordering districts.

Focused interventions in physical livestock markets:

The study highlights physical livestock markets as integral part of livestock value chain in India. The fact that large number of different species, ages of animals from different places are traded in these markets, makes each livestock markets a disease risk hotspot. The key findings indicates gap in infrastructure, institutions, incentives and process innovation in majority of these markets. It is suggested that state veterinary department should invest on GIS mapping and premises registration of livestock markets (See tool in annexure VI) and develop a dynamic (real time) database of markets with key information such as market days, volume of animal traded in a day, key contact addressed, sources and destination of animals etc. to begin with. Such a database will help prioritize focused actions aimed at infrastructure and institution building. Once institutions e.g. market committees, lease holders etc. are strengthened and planned infrastructure outlays are budgeted; attempts should be made to engage with market institutions for incentive based disease reporting arrangements and development, implementation of standard operating procedures (SOP) or good practice guide (GPG) for livestock markets based on principles of bio-security. It is also noted that prevention of haphazard growth of physical livestock markets and consolidation of markets where possible is another important step towards ensuring appropriate monitoring. Harmonization of current state level acts and regulation and empowerment of veterinary departments across states in matters governing registration, functioning of markets, transportation of animals etc. can be highlighted as the need of hour.

Annexures I-VIII (Developed Study guides, instruments and GIS data collection templates)

Annexure-I: Secondary Data requirement with possible sources

Sl. No	Data	Source
1	List of animal products with Harmonized System codes (up to four digits)	DGFT Website, GoI
2	Traffic flow through each of the identified Land custom stations (LCS) in select districts.	DGFT/ DGCI, GoI
3	Any available Animal Trade statistics (HS 01) between Indo-Nepal / Indo-Bhutan / Indo Bangladesh	DGFT, GoI
4	Guideline on processes at LCS e.g. trade recording format etc. (any reform initiative!)	DGFT, GoI
5	List of approved markets with classification (Primary / Secondary / Terminal) and days in market (Daily / Weekly) in all the targeted border districts	State Agricultural Marketing Board. (Note: Some districts do have statistics on market wise trade volume or size)
6	Detailed digital map and GIS topo-sheets (Soft copy) for select districts	Offices of Deputy Commissioners or District Magistrates in each district
7	List (with address) of all *Krishi Vikash Kendras* (KVKs) - Agricultural Development Centres / other Agricultural institutions in each of the selected districts.	ICAR – Regional units
8	Animal Health Infrastructure and details of on-going surveillances (if any) in select bordering districts	District Animal Husbandry Officer
9	Veterinary Department man-power set up in the select districts with number of trained staff on TADs	District Animal Husbandry Officer
10	Field diagnostic manuals for Vet and AHWs on TADs	Do
11	Pictures of Department organized awareness camps	Do
12	List of Private practicing vets and vets working in other than government Veterinary Departments e.g.	State level association of Veterinarians / List of Vets

	Municipalities, Market committees etc.	taking Agri-clinic training from NAARM website
13	District calendar of holidays / festivities	Office of District Magistrate
14	District level meteorological data (Month wise)	Office of District Magistrate / *Krishi Vikas Kendras* (KVKs).
15	Name (address) of major livestock trade hubs in all the 5 state capitals / major towns.	Private sector sales executives / Associations
16	Relevant published documents on cross border trade relation vis a vis political analysis	Different websites
17	Data on loan disbursements in livestock and related projects in select district	District level lead banks
18	District Livestock Population data (Most recent) with species break up and possibly revenue circle wise (important: Population in bordering revenue circle)	District Animal Husbandry Officer
19	Information on large grazing lands near border areas	District data from space research stations
20	List of Feed mills and other input manufacturing infrastructure with address in select state.	Department of industries / State Industry Association
21	List of commercial vaccine production units within the study area with leading distributors	State Biological Production centre / Regional Disease diagnostic labs
22	Area map around each of the identified LCS in select districts including major nearby town in both countries	Census 2011 Map / Google earth
23	Molecular epidemiological data on FMD / PPR outbreak in select border districts.	Regional Disease diagnostic laboratories
24	Studies related to characterization of production system, cattle fairs, breeding tracks and localized studies on livestock marketing in select states.	Agri-Vet University libraries
25	Legislations pertaining to registration of animal markets, provision for veterinary checks, health, cleaning, disinfection and animal welfare measures.	State Veterinary Directorates

Annexure-II

List of live animal and livestock / related products for international trade with Harmonized System (HS) Code (up to 4 digits)

HS Code	Name
0101	Live Horses, Mules ,Asses, Hinnies
0102	Live Bovine animals
0103	Live Swine
0104	Live Sheep and Goats
0106	Other live animals Mammals
0201	Meat of bovine animals, fresh and chilled
0202	Meat of bovine animals, frozen
0203	Meat of swine, fresh, chilled or frozen Fresh or chilled
0204	Meat of sheep or goats, fresh, chilled or frozen
0205	Meat of Horses, asses ,mules or hinnies, fresh, chilled or frozen
0206	Edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, chilled or frozen
0208	Other meat and edible meat offal, fresh, chilled or frozen
0209	Pig fat, free of lean meat and poultry fat, not rendered or otherwise extracted, fresh, chilled, frozen, salted, in brine, dried or smoked
0210	Meat and edible meat offal, salted, in brine, dried or smoked; edible flours and meals of meat or meat offal Meat of swine :
0401	Milk and Cream, not concentrated or containing added sugar or other sweetening matter.
0402	Milk and Cream, concentrated or containing added sugar or other sweetening matter.
0403	Buttermilk, curdled milk and cream, yogurt, kephir and other fermented or acidified milk and cream, whether or not concentrated or containing added sugar or other

	sweetening matter or flavoured or containing added fruit, nuts or cocoa.
0404	Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents, whether or not containing added sugar or other sweetening matter, not elsewhere specified or included.
0405	Butter and other fats and oils derived from milk; Dairy spreads.
0406	Cheese and Curd
0410	Edible products of animal origin not elsewhere specified or included. E.g. from wild-life
0502	Pigs', hogs' or boars' bristles and hair; badger hair and other brush making hair; waste of such bristles or hair.
0503	Horsehair and horsehair waste, whether or not put up as a layer with or without supporting material
0504	Guts, bladders and stomachs of animals (other than fish), whole and pieces thereof, fresh, chilled, frozen, salted, in brine, dried or smoked
0505	Bones and horn-cores, unworked, defatted, simply prepared (but not cut to shape), treated with acid or degelatinised powders and waste of these products Bones, including horn-cores, crushed:
0506	Ivory, tortoise-shell, whalebone and whale-bone hair, horns, antlers, hooves, nails, claws and beaks, unworked or simply prepared but not cut to shape; powder and waste of these products.
0509	Natural sponges of animal origin
0510	Ambergris, castoreum, civet and musk; cantharides; bile, whether or not dried; glands and other animal products used in the preparation of pharmaceutical products, fresh, chilled, frozen or otherwise provisionally preserved.
0511	Animal products not elsewhere specified or included; dead animals unfit for human consumption.
2301	Meals and pellets of meat or meat offal unfit for human consumption
2309	Preparations of a kind used in animal feeding e.g. Compound Animal Feed
4101	Raw Hides and skins of Bovine (including buffalo)or Equine Animals (Fresh, or salted, dried, limed, pickled or otherwise preserved, but not tanned, parchment-

	dressed or further prepared), whether or not dehaired or split
4102	Raw skins of sheep or lambs (fresh, or salted, dried, limed, pickled or otherwise preserved, but not tanned, parchment-dressed or further prepared), whether or not with wool on or split, other than those excluded by Note 1 (c) to this Chapter
4103	Other raw hides and skins (fresh, or salted, dried, limed, pickled or otherwise preserved, but not tanned, parchment-dressed or further prepared), whether or not dehaired or split, other than those excluded by Note 1(b) or 1(c) to this Chapter
4104	Tanned or crust hides and skins of bovine (Including buffalo) or equine animals, without hair on, whether or not split, but not further prepared
4105	Tanned or crust skins of Sheep or lambs, without wool on, whether or not split, but not further prepared
4106	Tanned or crust hides and skins of other animals, without wool or hair on, whether or not spl it But not further prepared

Annexure-III (Guide for Focus Group Discussions and Key Informant Interview)

Definitions

Key Informants:

Key informants are individuals selected on the basis of criteria such as knowledge, production/ trade / institutional relationship, age, experience, or reputation, who can provide required information in the context of the study as specified in research guide(s).

Focus Group:

For this study a focus group is defined as a group of minimum 5 individuals belonging to same or multiple stakeholder groups in the context of livestock value chain (Farm to Fork). They can be from different social strata / caste / religion. They may or may not be related to each other or from same geographical location. The only criteria for conducting a discussion with such a group are judgemental and guided by clear intent on the part of the field team to record relevant information as specified in research guide (s).

This KII (Key Informant Interview) / FGD (Focused Group Discussion) guide is prepared for interaction with following List of stakeholders (Not exhaustive)

Note: Stakeholders are individuals, groups (formal and informal) and organizations who are affected directly or indirectly; positively or negatively; in present context or in future due to any intervention / project or policy

a. *Commercial (Production and Breeding) Livestock (Cattle + Buffalo + Sheep + Goat +Pig) Farm Owner*
b. *Officials of Government farms*
c. *Backyard Livestock Farmers (Cattle + Buffalo + Sheep + Goat +Pig)*
d. *Commercial Feed Millers*
e. *Suppliers / Dealers / retailers of Animal Feed ingredients.*
f. *Medicine / Vaccine / Feed supplement / Farm equipment dealers & retailers.*
g. *Live animal / livestock product wholesalers*
h. *Live animal or products (meat & milk) retailers*
i. *Officials / Members of cooperatives / producer companies / Self-help groups engaged in livestock business.*
j. *Officials of Organized slaughter house & Processing centres (Government / Private)*
k. *Owners / Officials of cold storages (Government / Private)*
l. *Traders in By-Products sector (Hide / Bone etc.: See list with HS Code.)*
m. *Veterinarians, Members of government surveillance team, Field Assistants / Vaccinators / Village Level Workers)*
n. *Municipal and other regulatory Officials*
o. *Officials of Marketing Committee / Board official / lessee*
p. *NGO and other development workers*
q. *Bank and officials of development agencies.*
r. *Aggregator of livestock.*
s. *Contract grower / fattener of livestock.*
t. *Stockist / traders of Frozen / Value added livestock products*
u. *Hotel / Restaurant / Food joint owners serving dishes made from livestock products (Meat and Milk)*
v. *Traders sourcing sheep wools.*
w. *Owners / drivers of transport vehicles / Association of transporters*
x. *Check / custom gate officials / Police and person from law enforcement agencies*
y. *Private agencies providing custom clearance service.*
z. *Managers / technical experts, Sales representative of Companies engaged with any other livestock business.*
aa. *Village headman / priest / Intellectuals / Local Resident*

Please note any other stakeholder group (On the revised side of this page)

Note for Facilitator / interviewer

*The learning from this study will be used by Vet Helpline India to facilitate effective policy making / project development and people friendly disease control interventions in the context of livestock / livestock product trade. Vet Helpline India intends to facilitate 'people cantered' actions focussing on 6 '**I**'s such as **i**ncentive for positive behaviour, **i**nfrastructure development, **i**nvestment facilitation, improvement in **i**nput quality, **i**nnovation in practices and **i**nstitution building.*

Following are guide questions only. Choice of question from amongst the suggested one for a particular key informant / FGD will depend on judgement of the interviewer/ Facilitator. For groups / KII where no guide question is provided, interviewer needs to use his own ingenuity. The approach of the interviewer should be that of a person who wants to learn about the business of the interviewee (Decisions and actions he or she takes linked to Activities, Relationships, Motivations, Movement) in order to scientifically document and share it with others for common good, e.g. better government policy. Note that the text in italics alongside each guide question is the intent or logic behind the question)

Interviewers need to internalize required information and engage in informal talks with the key informant, sequencing questions best suited to the flow of conversation. As far as possible, interviews / FGD are to be conducted near business places of interviewees / participants. Preferably the setting should be informal.

No prior fixing of date for focus group discussion is mandatory. Field researcher will use his / her judgement to decide on date, time and place of such meeting. (Note collection of GPS point for place of each FGD / KII is mandatory)

It is suggested that, conversations be recorded where possible and interviewer does his or her information compilation immediately after the interview, sitting in a neutral place. Where possible, it is suggested that a minimum of two interviewers are present during interview of a key informant or conducting a FGD and they consult each other while compiling collected information. Where possible, each field note of FGD / KII should be forwarded to principal investigator on the same day for his comment and suggestions.

Voice Recordings and spot learning note of the interviewer for each of the individual and group interaction will be the basis for qualitative risk assessment and identification of value chain options, actors and dynamics thereof.
Seek permission of the interviewee for taking photograph in his / her premise.

Guide questions for Commercial Farm Owner:

Note: A commercial farmer is an individual who is rearing good quality livestock (any number) as an enterprise (organized / semi-organized / unorganized) primarily to meet market demand of livestock / products. For him / her normally livestock farming is a primary livelihood option.

(This guide can also be used for government farms with required modification of questions considering mandate of government institution)

Name of Key Informant / leader of FGD participants:

Contact Address (With telephone):

Location of farm / FGD (If different from above):

GPS Locator reading (of the location):

Guide Questions:

1. How long you are in commercial farming? Tell us about your endeavour, growth story and problems faced –if any (*Need to capture: Investment, Years of Experience, business environment awareness, business growth and specific problem faced etc.*)
2. What according to you is the population of livestock farms in your locality? Did you observe growth in last few years? If not why?
3. What is the average size of herd in your area? What is the production system? (intensive / semi-intensive / Open herd *(Note: Presence of large open herd is risky)*
4. Did you try to increase your own herd of animals? Is it mostly through in-house breeding or through purchase from market? From where do you buy replacement stock? And how frequently? (*Capture: any constraint for increasing farm size*?, *note: frequent introduction from outside is risky*)
5. How frequently do you meet other farm owners? Do you help each other? (Need *to Capture: Existence of collective efforts or trend of organized activity e.g. SHG, Cooperatives etc*.)
6. From where are you getting farm inputs e.g. Feed / Equipment / Vaccines / Medicines etc. Can you help us understand price and market of these inputs? *(Capture cross-border trade on inputs or identify traders serving both countries on each side of border)*
7. Are you happy with the quality of inputs? What care do you take to ensure profit, bio-security and quality? (Focus *on all possible inputs*. *Need to capture existence of credit market, effect of season on availability, awareness and initiative at farm level to check quality and bio-security)*
8. How do you ensure regular production? (*Check practice of breeding, induction of new animals*)
9. Any specific market requirement? e.g. preferred sex, age etc.
10. When is the flush and lean season? What are the difficult periods in a year in terms of farm management? E.g. costly input, outbreak of diseases.

11. Can you elaborate about your marketing arrangements? (*Capture: Destination of produced animals / products (Any distant market out-side the district?), Role of traders (e.g. monetary advances, multiple or single pick up), Own marketing arrangements, Cooperative, Institutional Sale (e.g. Sale to hotels, army base –if any), margin in each cases etc*.)
12. Are you happy with the price you are getting as of now? When in the year prices are high or low? Do you know any other way to get better price e.g. sale to army, Border trade? *(Check for existence of cartel of any nature*)
13. Did you slaughter animals / sell meat within your farm premises e.g. against direct orders from consumers?
14. Do you get any market for farm by-products? What are the other sources of revenue from your farm*? (Capture where the by-products are going – their uses etc.)*
15. Are you using or selling farm manures*?* What is the current use or destination (if sold)
16. What do you do with old and unproductive animals? *(Note culling practices*)
17. What do you do with the male cow calves and buffalo calves?

18. Do traders come to your farm directly for buying animals / products or you need to take animals / products to traders? (*Capture: Any restriction of people's or vehicle movement and relationship between farmer and trader)*
19. Do you fatten animals? Is it regular or occasional? *(Note: Informal or occasional fattening is likely to be risky)*
20. Is there anybody who gives credit or supply animals to you for rearing / fattening of animals in your farm? *(Capture: Organized action for contract growing)*
21. How far is the market? How many markets do you visit regularly? (*Capture: Any problem in access to market or specific problem in market places)*
22. Are there any period or month / festivities when prices go up? Where or which market (in your area) do you think most of the livestock are traded?
23. How do you think one can get better price of one's livestock? *(Capture: additional marketing channels)*
24. How do you perceive risk in farming? What should we all do to help livestock business? Do you get a chance to discuss farm related issues in any platform? Who takes leaderships e.g. traders (Capture *local dynamics – e.g. few people influencing everything*?)
25. What are the diseases affecting the animals?
26. Do you remember the last disease outbreak? Did you suffer any loss? Did anyone help you at that time? (*Capture the situation faced by the farmer at the time of outbreak, nature of loss*)
27. Who provides you veterinary services? (Government / Private / Own). What care should we take to prevent diseases?
28. How are you planning to expand your business? What according to you can one do apart from being livestock farmer? (*Capture: Any alternative or related business with similar skill requirement: willingness and trend towards value chain integration!)*
29. Can a farmer do trading too? (*Capture : Entry barriers for trading*)

30. Have you come across persons who play multiple roles as farmer, live animal trader as well as retailer of meat / milk etc?)
31. Are you a beneficiary of any government schemes? What are the key issues for your farming business and how can government help?

Write here any other questions that may be relevant in the context of understanding the activities related to commercial livestock farming, motivation behind actions, relationship and dynamics (Production / market related) thereof.

Guide questions for traditional Farm Owner:

A backyard farm owner is an individual who rears mostly indigenous animals as one of the livelihood and insurance options. For those having land, the activity is as a part of eco-agriculture primarily to meet immediate house hold need for food. Such farms occasionally sale surplus livestock / livestock products.

Name of Key Informant / Leader of FGD participants:

Contact Address (With telephone)

Location of interview / FGD (If different from above):

GPS Locator reading (Of the location):

Guide Questions:

1. How important is livestock for you? (Capture*: Contribution to household income / insurance / cultural contribution. Note: other livelihood options*)
2. What are the other sources of your income?
3. Do you think you can earn more from your livestock? Did you try to increase your herd of animals in the backyard? *(Capture : constraint for transition to commercial)*
4. To you take animals for grazing? And Where?
5. Do you practice confinement of your backyard animals (*Note practices e.g. tethering in case of pigs*)
6. What care do you take for nutrition and health of animals? (Capture *the bio-security awareness, practices and strategy of the farmer / group to manage feed, fodder, vaccine, veterinary service, shelter etc*.)
7. How do you breed your animals?
8. Do you think vaccination can save animals from diseases? (*Capture : risk perception, tolerance and faith on veterinary care*)
9. Is there anybody (e.g. Micro Credit) who gives credit or supply animals for rearing / fattening in the back yard? *(Capture: Organized action – if any for contract growing / fattening)*

10. Do you sell live animals or livestock products? To whom? Did he/ she give you any advance? (*Capture: Role & practices of aggregator)*
11. What is the price given by the trader or aggregator when products are collected from home and / or local market? (*Capture : Profit to farmers / margin*)

Write here any other questions that may be relevant in the context of understanding of the business of backyard farming and dynamics thereof.

Guide questions for Feed miller

Name of Key Informant / Leader of FGD participants:

Contact Address (With telephone)

Location of interview / FGD (If different from above):

GPS Locator reading (of the location):

Guide Questions:

1. How long you are in this business? Tell us about your endeavour, growth story and problems faced –if any (*Need to capture: Investment, franchisee agreement-if any, Brand name, Installed capacity, % utilization, Years of Experience business environment awareness, business growth and specific problem faced etc.*)
2. Are you (do you plan) integrating your business? E.g. setting up of own livestock farm / contract farm?
3. How many people are there in this business in your district? How frequently you meet them? Any club / association?
4. Can you give us rough idea of volume / size of feed business (in terms of unit or rupees) in your district?
5. From where are you getting feed ingredient (including supplements)? Can you elaborate about place of origin of the input and number of such suppliers?
6. Any unique feed ingredient in your area? Prices / Source?
7. What is your current production (in case of feed mill)?
8. Can you elaborate on current prices of inputs? What is the normal frequency of procurement? Do you need to stock inputs?
9. Are you happy with the quality of inputs? What care do you take to ensure profit, bio-security and quality?
10. Do you have access to any laboratory for feed testing? What according to you constraints a feed miller in producing quality feed?
11. Can you elaborate on production cost and profit margin per unit of production?
12. How do you rate your competitiveness in comparison with feed mill from known production belts within the country? What are the main constraints?
13. Any factor that influences price change of inputs?

14. When is the flush and lean season for your business? What are difficult periods in a year in terms of management / business risk? E.g. costly input, outbreak of diseases.
15. Can you elaborate about your marketing arrangements? (*Capture: Destination of feed (Any distant market out-side the district? To border countries), any Institutional Sale (e.g. Sale to Government?),*
16. Do you rely on any third party to market your products? How many of such clients do you have? Any estimate of traders dealing with feed within your district?
17. How is the competition like? Do you see supplies from outside the district? What is the volume of trade from outside the district? Alternatively, do you sale outside your district? Any export potential through borders?
18. Any business that you think can best integrate with feed? e.g. Food Processing -Soy chunks production with Feed Mill
19. What do you do to create demand for your feed? Are you investing on commercial farms? (*Capture : Any effort towards integration*)
20. Any by-product of your operation e.g. Quantity and disposal / use (if any)?
21. Are you facing any issues / regulatory related policy actions that are hampering growth of business? Can you elaborate?

Write here any other questions that may be relevant in the context of understanding of the business of Feed Millers, other input suppliers and dynamics thereof.

…….

Guide questions for Traders of Livestock, farm Inputs (Feed, Equipments, Medicine, Supplements,) wholesalers and retailers of livestock products

Name of Key Informant / Leader of FGD participants:

Contact Address (With telephone)

Location of interview / FGD (If different from above):

GPS Locator reading (of the location):

Guide Questions:

1. How long you are in this business? Tell us about your endeavour, growth story and problems faced –if any (*Need to capture: Investment, whether trading is a single earning source or any other source, Details of traded products, Categories of trading e.g. stockist to retailer, years of Experience, business environment awareness, business growth and specific problem faced etc.*)
2. People perceive that traders are just ‘middle man’ who does not make much investment of his / her own. Can you elaborate as to what kind of investment is

required for one to start trading in livestock business? How tough is the business (*Capture: Entry barriers!*)

3. Are you (do you plan) integrating your business? E.g. setting up of feed mill, own farm / contract farm?
4. How do you help a client farmer? Can you elaborate on farmer –trader symbiotic relationship?
5. What are the risks associated with your business? Any personal risk? Any suggestion as how to face such risk?
6. How many people are there in trading business in your district? How frequently you meet them? Any club / association?
7. Do you have trading partners or a close group to help each other?
8. Besides government farms / establishments, do you have any other institutional clients for livestock / livestock products (including inputs e.g. feed etc.)?
9. From where are you getting animals /farm inputs for trading? (*Capture: Source – volume / frequency, payment terms etc*.).
10. Do you give advances to producers to rear or fatten animal for you?
11. How frequently you need to stock Livestock / farm inputs or products? Is storage or delivery a problem? What kind of infrastructure do you have or you take on rent?
12. Can you give us rough idea of volume / size of the livestock trading business in your district? Who are the people / offices that help in livestock trading business?
13. What do you do to ensure and maintain quality of traded farm inputs or quality, hygiene / safety of livestock products for consumers?
14. Any specific steps / activity you take to ensure bio-security or to help prevent outbreak of diseases. *(Capture: Practice of isolating diseased animals, disposal of dead animals, Vaccination, visit of vets, dipping or washing of vehicles)*
15. What happens to price of traded animals when there is declared outbreak of disease? *(Capture: the outbreak scenario and how the traders react, how they recover losses, any premium price they fix for risk?)*
16. When in the year you have ups and downs in the market? (in terms of demand)
17. Do government veterinary services inspect animals you trade? *(Capture: frequency / cost etc.)*
18. How do you transport livestock / livestock products? (Capture *presence of organized transport companies, check the practice of livestock permit of vehicle e.g. who issues the same, conditions of licence etc.*)
19. What are the average distance animals are made to travel Vis a Vis average time of travel? What is the preferred mode? (By foot / by trucks etc.)
20. How many livestock market are there in your district? Do you visit all or few *(Capture access issue if any? Is multiple market visit common for traders?)*
21. How about international trade? Do you cross Land custom stations with livestock or livestock products? Any other route? (Capture*: products, source / destination, volume, frequency, nature of trade etc.)*
22. How frequently do you meet livestock traders from across the international borders?
23. What according to you determine the prices of livestock / farm inputs and/or livestock products? How can market forces affect your margin?

24. How do you manage finance? *(Capture access to formal institutions, advances between traders, trade on credit or understanding etc.)*
25. Do you employ any people? *(Capture : work done by employees)*
26. Are you facing any regulatory hassles e.g. Renewal of Trade licence, Sale tax? Can you elaborate on this?
27. Do you pay any tax and to whom? Any security problem?
28. Is there any import threat? Or one big trader doing monopoly?
29. When there is a trade related conflict how do you solve? (*Capture: internal cohesiveness of the trading community*)
30. Are you a beneficiary of any government scheme? Any problem in accessing government support? *(Capture : Land ownership or citizenship issues)*

Write here any other questions that may be relevant in the context of understanding of the business of Livestock traders and dynamics thereof.

Guide questions for Veterinarians, Members of government surveillance team / Rapid Action Team, Field Assistants / Vaccinators / Village Level Workers)

Name of Key Informant / Leader of FGD participants:

Contact Address (With telephone)

Location of interview / FGD (If different from above):

GPS Locator reading (of the location):

Guide Questions:

1. Can you help us list the commercial and Backyard livestock production areas separately for your district? What is your opinion regarding growth of farms / animal population in these areas in last few years?
2. What are the known livestock markets / animal holding areas within the district?
3. Can you help us understand the risk in livestock business (*Facilitate the discussion by explaining various forms of risk such as People, Process, Policy, Political, Technological and Financia*l)?
4. From your experience, can you elaborate on profit margin at various stage of value addition in livestock business?
5. Which class of stakeholder e.g. farmer, trader, processors do you think are most influential and why? Can you help us list organizations of livestock sector stakeholders active within the district?
6. Can you identify any unique practice within the district that is related to livestock?
7. Regarding bio-security, what according to you is preventing some people to follow the guidelines?
8. What according to you should the government do to strengthen voluntary disease reporting? How can we involve farmers and traders?

9. Did you come across any farm input (including medicine / supplements) which are of unknown origin and /or imported to the district?
10. What is your opinion regarding current practices related to disposal of livestock by products? Do you know anyone using these by-products?

Write here any other questions that may be relevant in the context of understanding of Livestock value chain and dynamics thereof from an informant Veterinarian and other service providers.

Guide questions for Municipal and other regulatory / check gate Officials:

Name of Key Informant / Leader of FGD participants:

Contact Address (With telephone)

Location of interview / FGD (If different from above):

GPS Locator reading (of the location):

Guide Questions:

1. Can you help us with year-wise statistics (last 3 years) on registered business premises / shops etc. along with nature of business in the field of livestock trade within the township / district?
2. Are you enforcing any law regarding waste disposal and clean / hygienic market place?
3. Do you play any role in fixing of prices of live animal / livestock products?
4. Are you aware of import / export of live animal / livestock product from neighbouring countries? Is there any system to keep track of such legal and / or informal trade?
5. How many vehicles are there within the district / township with "Livestock Permit"? What is the criteria and fee requirement for granting a permit?
6. Do you have any statistics on inter district, inter-state and between border country movements of vehicles with livestock permit?
7. What are the establishment / annual cost to a trader in terms of trade licence fee etc.?
8. Do you witness livestock trade through Land custom stations or any other route? *(Note: Legal live animal trade in India is only allowed through air and sea port having quarantine facility)*
9. Is there any livestock products e.g. Meat, Milk, Hide etc. that are traded across land stations or other routes?

Write here any other questions that may be relevant in the context of understanding of Livestock value chain and dynamics thereof from an informant regulatory official.

……

Guide questions for Officials of Marketing Committee / District Marketing Board official / lessee etc.

Name of Key Informant / Leader of FGD participants:

Contact Address (With telephone)

Location of interview / FGD (If different from above):

GPS Locator reading (of the location):

Guide Questions:

1. Can you help us list known markets within the district where live animals / livestock products (including farm inputs) are traded?
2. Do you know any place where animals from rural areas are simply aggregated for onward movement to large markets?
3. Can you give some information on market fees and other fees that farmer / trader aggregators need to pay.
4. Can you elaborate on deficiencies (if any) on current acts governing the markets and its management?
5. What do you expect from Veterinary department as far as health of animals that are brought to markets for trading?

Write here any other questions that may be relevant in the context of understanding of Livestock value chain and dynamics thereof from an informant marketing committee members.

……..

Annexure-IV (a)
Schedule for Farmers

Name of the Enumerator	
Name of the Region	
State	
District	
Revenue block:	
Name of the area	

1. Name of the Respondent:

2. Contact address and phone number (Where possible):

3. Age of the Respondent:

4. Gender: ☐ Male ☐ Female

5. Years of Experience in livestock farming:

6. Land holding :

7. Name of cultivated crop(s):

8. Other source of family income:

☐ Government Job ☐ Private job ☐ Trading

☐ Agriculture ☐ Anyother (Specify……

9. Generation in the livestock farming:

☐ First Generation ☐ Second Generation ☐ Third generation

10. How important is livestock farming for you considering other sources of household income?

☐ High ☐ Medium ☐ Low

11. Farming with:

☐ Cattle ☐ Buffalo

☐ Sheep ☐ Goat

☐ Pigs ☐ Other (Please Specify):……..

12. Do you rear captured feral / wild animal for farming?

☐ No ☐ Yes (Specify…….)

13. You mostly rear animals in:

☐ Free range

☐ Semi confinement

☐ Complete confinement

14. How many adult animals do you have?

Name of the Animal	Number of the Animal
Cattle	
Buffalo	
Sheep	
Goat	
Pig	

15. Do you feed branded compound feed to your animals?

☐ Yes ☐ No

16. Do you also sell livestock products / by-products?

☐ Yes ☐ No

17. If yes, what livestock product / by product you sell?

☐ Milk and Allied products ☐ Meat

☐ Wool ☐ Hide/Skin

☐ Other (Please Specify)…

18. Are you a member of any cooperative?

☐ No ☐ Yes (Specify Name……..)

19. Whom do you sell your farm animals most?

- ☐ Individual consumers
- ☐ Traders
- ☐ Institutions e.g. Army camp etc.
- ☐ Any other (Specify)

20. How do you mostly sell your farm animals?

☐ By visiting local market ☐ Delivering to traders at farm gate

☐ Delivering to slaughter houses directly ☐ Direct selling to consumers

☐ Any Other ……..

21. Do you trade in live animals? (e.g. buy and sell animals those are not from your own farm) ☐ Yes ☐ No

22. Do you represent or work under any big trader?

☐ Yes ☐ No

23. Do you receive cash advances/live animals (Calves etc.) from traders to rear or fatten?

☐ Yes ☐ No

24. Do you farm in group e.g. Self Help Group?

☐ Yes ☐ No

25. Where from you buy animal for farming?

☐ Within District ☐ Inter district

☐ Inter State ☐ Areas in bordering countries

26. You buy animals for farming mostly from?

☐ Local Market ☐ Form other known farms ☐ Local traders ☐ any other

27. Can you name few important animal diseases in your area?

…….

28. Do you receive services of Vets or Animal health workers?

☐ Yes ☐ No

29. What preventive measures you take for diseases?

☐ Can't answer ☐ Vaccinate animals ☐ Segregate diseased animals

☐ Any other……

30. When required how do you manage finances?

☐ Own sources ☐ Banks

☐ Other trader ☐ Informal money lenders

☐ Other (Specify):

31. Are you a beneficiary of any government scheme?

☐ Yes ☐ No.

Note of Enumerator (If any)

……
……

Annexure-IV (b)

Schedule for Traders

Schedule for Traders

Name of the Enumerator	
Name of the Region	
State	
District	
Revenue block:	
Name of the area	

1. Name of the Interviewee:

2. Contact address and phone number (Where possible):
   ……..

3. Age of the Respondent: ☐ Young ☐ Middle aged (30 +) ☐ Old (50+)
4. Gender: ☐ Male ☐ Female

5. Years of Experience:

6. Generation in the trade:

   ☐ First Generation ☐ Second Generation ☐ Third Generation

7. Deals in:

   ☐ Cattle ☐ Buffalo

   ☐ Sheep ☐ Goat

   ☐ Pigs ☐ Other (Please Specify):……..

8. Do you also trade on livestock products? Yes ☐ No ☐

9. If yes, what livestock product you trade?

   ☐ Milk and Allied products ☐ Meat

   ☐ Wool ☐ Hide/Skin

   ☐ Other (Please Specify):……..

10. Do you also trade on farm inputs e.g. Feed/Medicine etc.?

☐ Yes ☐ No

11. How important is trading activity for you considering other sources of household income?

☐ High ☐ Medium ☐ Low

12. Do you represent or work under any big trader? ☐ Yes ☐ No

13. Do you trade in group or partner with other select traders?

☐ Yes ☐ No

14. What is your trading area?

☐ Within District ☐ Inter district

☐ Inter State ☐ Areas in bordering countries

15. How frequently do you visit the bordering country?

☐ Never ☐ Regularly ☐ Occasionally.

16. How frequently do you meet a trader from bordering/neighbouring country?

☐ Regularly

☐ Occasionally

17. Number of people you have employed…….

18. Do you keep traded animals in a holding yard before sale in actual market?

☐ Yes ☐ No

19. If yes, what is the ownership of such holding yard?

☐ Own ☐ Private Rented Government

☐ Community ☐ Other (Specify……..)

20. Do you have your own farm? ☐ Yes ☐ No

21. If yes, How far is holding yard from your own farm?

☐ I keep animals for trading within my own farm

☐ Nearby (Within 3 km)

☐ Far

22. How much time (in average) you keep animals in holding yard (in days): …….

23. From whom do you buy the livestock?

- ☐ From farmer's doorstep
- ☐ From other traders or aggregators
- ☐ From markets
- ☐ Any other (Specify)…

24. Whom do you resale your livestock?

- ☐ Directly to consumers (For rearing or own consumption)
- ☐ To slaughter houses
- ☐ To other traders
- ☐ Institutions (Army, hotels etc.)

25. How many markets do you visit for trading?

☐ Single ☐ Multiple

26. Do you have your own vehicle for transport of animals?

☐ Yes ☐ No

27. If no, how do you transport animals?

☐ On foot ☐ by hired vehicle ☐ other (Specify…….)

28. Do you receive services of Vets or Animal health workers? ☐ Yes ☐ No

29. Can you name few important diseases of livestock?

……

30. What preventive measures you take for diseases?

☐ Can't answer ☐ Vaccinate animals ☐ Segregate diseased animals

☐ Any other……

31. When required how do you manage finances?

☐ Own sources ☐ Banks

☐ Other trader ☐ Informal money lenders

☐ Other (Specify):

32. Do you give advances/live animals to farmers to rear or fatten?

☐ Yes ☐ No

(Enumerator can use this space to write any specific observation pertaining to the interviewee)

33. Volume of Livestock usually purchased by the trader:

Livestock type	Volume bought on average per month (in number)	% bought from farmers (As opposed to middle man)	Purchase from whom (see codes below§)	Purchased from where (see codes below†)	Buying price (in Rs.)	Transaction Cost‡ (in Rs.)
Buffalo (Male)						
Buffalo (Female)						
Cattle (Male)						
Cow/Heifer						
Sheep						
Goat						
Pigs						
Others (Specify)						

Notes: §Codes: 1= Direct from farmers, 2= Other traders (Aggregators), 3= From livestock markets through auction, 4=Any other
†Codes: A= within district, B= from the state C= from other state, D= Border country
‡Transaction cost includes: Transportation cost, Feeding cost, Mortality cost, Interest on capital, marketing tax etc.

34. Volume of Livestock usually sold by the trader:

Livestock type	Volume sold on average per month (in number)	% sold to other big traders (in lot) for onward supply	% of animal taken to any distant market (on foot/by transport)	Market of sale (see codes below†)	Average selling price (in Rs.)
Buffalo (Male)					
Buffalo (Female)					
Cattle (Male)					
Cow/Heifer					
Sheep					
Goat					
Pigs					
Others (Specify)					

Notes: †Codes: A= Within district, B= Within the state C= Outside the state, D= International (Border country)

Annexure-V
Market intelligence guide

Note for field team

This guide is prepared exclusively for writing reports related to visits to livestock markets. Being a guide for intelligence study, questions are not exhaustive and the field researcher should use his / her own ingenuity. Please collect documentary / photographic evidences where possible and include the same within the report.

We have named the guide as 'Market intelligence study guide" as we are looking for holistic knowledge of all aspects of marketplace that can be linked to disease transmission. The focus is to gain insights (Beyond just analysis), understand the dialogue (not just communication) and capability of actors.

Vet Helpline India Pvt Ltd.

Market details

1. Name of the market.
2. Location.
3. GPS coordinate of the market:
4. GPS coordinate of major feeding clusters (up to 3) or livestock production centres to that market.
5. Classify the market? Primary- aggregation / Secondary / Terminal *(In a terminal market the main buyers are mostly exporting traders and organized slaughter houses)*
6. Note market infrastructure e.g. Covered / open yard, Water facility, boundary wall etc.
7. Note market institutions e.g. Market committees, trader associations etc.
8. Whether regulated or unregulated?
9. Geographical spread (Area) (Use GPS machine if secondary data is not available)
10. What is the estimated volume of livestock trade in terms of number of animals traded in a market day? (Estimation will be based on judgement only)
11. What is the estimated number of people visiting the market (Both Seller + Buyer) in a market day? (Only judgemental estimation in numbers)?
12. What is the known trader or buyer concentration? (Concentration is high if only few buyer or trader)
13. List market days? If multiple market days, which day is more important and why?

Composition of trade

What is traded? (Please note species of livestock and livestock products)

Note the characteristics for traded livestock commodity? (E.g. Breed of majority animals, type e.g. cow / heifer / calves, average age and majority sex etc.)

What is the direction of trade? (Import vs. Export)

What is the purpose of trade (Species wise) in that market?

(Purpose can be for slaughter, breeding, distribution to other parts of country etc. Please collect evidence of inter-state transfer or export of animals from any market)

Supply to the market:

What are the feeding clusters or production centres? (Single location vs multiple locations) with names. (Point of origin of animals bought to the market)

Which cluster has the highest frequency in terms of supply to the market?

What are the characteristics of majority of feeding clusters or production centres? (Small holder Backyard village system / commercial farming with confinement of animal / farming in open grazing)

What are the destination markets in neighbouring countries?

What are the modes of transport for traded animals?

Season

When is the high demand? How much is the price fluctuation due to season?

(Note any other information that indicates effect of seasonality)

Prices:

Please collect prices on given day (Species wise) according to age/ breed, weight and sex (Any other which determine premium or customer preference? E.g. body size / body conditions or body scoring)

Market practices:

How the prices arrived at? (Auction vs. One to one or Dyadic, group of trader influencing or determining the price etc.)

How the purchasing financed? (Availability and Source, note any organized group of people or effort of market committees)

What are the contract or payment methods?

Any standards (including that of bio-security) followed e.g. Display of rates etc.?

Is there any practice of holding animals or storage of livestock products in market yard?

Is there any slaughtering within the market?

What are the practices related to disposal of dead animals, cleaning and disinfection.

Average acquisition price of an animal brought to the market and Transaction Cost:

What is the average acquisition price of a healthy adult animal (species wise) at the farm gate?

What is the average transaction cost (Species wise, per animal) and margins* per adult animal thereof?

Transaction cost includes: Transportation cost, Feeding cost, Marketing tax, Mortality loss, Interest on capital (Note: We are ignoring opportunity cost of the trader and Risk premium in calculating the transaction cost)

(Margins can be defined as the difference between the sales price of the animal and cost incurred by the seller including acquisition price of the animal.)

Annexure-VI
GPS Attribute guide

Name of the State:…….. Name of the district: ……. Bordering country(s):……

Livestock Market

Name of the market	Coordinates	Data Set -1 Volume of Trade in number of live animal traded : Give relative rank : 1-3 (3 highest)	Data Set -2 : Trader Concentration : Low / High (Low: Maximum number of traders)	Data Set -3 Feeding production cluster Give rank 1-3 (3 maximum number of feeding cluster)	Data set-4 Linkage to International / border trade 1= for Yes 2 = No.	Data set-5 Evidence of Inter-state / inter-district movement of live animals to and from the market 1= for yes 2=no

Name of the State:……Name of the district(s): ……..Bordering country(s):……

Livestock Movement routes

Name of the route with Starting point and probable destination (s)	Vehicle Rest Points (VRP)	Check gates Within India / with bordering country (CG-Country)	Veterinary Facility en-route (VF)	Important landmark (Name) e.g. Major town / Railway / Bus station-en-route	Livestock Markets en-route. (LM)	Animal loading / unloading point (ALP)	Trader Point with or without Animal Holding Yard (TP / TP-HY)	Known production clusters en-route (Name)	Feed Mill (FM) Organized Slaughter house (SH) Large Organized Farms (LOF)	Relative importance of the route in terms of volume of trade (Rank 1-3 : 3 Maximum)

Annexure-VII
Guide for risk factors for TADs transmission

Besides previous incidence / frequency of disease outbreak, following are 10 key known risk factors for spread of TADs:

1. High concentration of livestock near border areas e.g. Production cluster / Livestock market.
2. Presence of common grazing lands and/ or transhumance movement of livestock.
3. Unsafe and long duration movement of large number of livestock / livestock products across borders (mostly by foot through illegal routes)
4. Inadequate regulatory framework / quarantine facility / law enforcement regarding international trade / Licensing of markets / animal movement.
5. Inappropriate Animal husbandry, market and trade practices in production clusters, markets across border. Such as:
    - Inadequate and inappropriate vaccination
    - Un-clean farm environment
    - Free (uncontrolled) rearing of livestock
    - Unrestricted movement of human, vehicles etc. within farm premises
    - Introduction of new animal to flock without quarantine.
    - Non-isolation / reporting / treatment of diseased animals
    - Distress sale of disease animals at cheap rate.
    - Inappropriate disposal of dead animal.
    - Mixing of animals procured from various locations
    - Unhygienic / unscientific slaughter
    - Swill feeding of food scraps e.g. unprocessed meat, offal to Pigs.
    - Allowing contamination of farm inputs e.g. Feed and transport of contaminated inputs from one place to other.
6. Presence of national park or wild-life sanctuaries and large water bodies in border areas (Chances of contacts between wild and domestic herd of animals with wild serving as reservoir of disease)
7. Trade of raw internal organ of hunted wild animals.
8. Political instability / civic unrest in border areas.
9. Inadequate animal health care facility and disease surveillance in border and in-country production clusters / markets.
10. Absence or ineffective farmers / traders organization with collective leadership / wisdom.

Annexure-VIII

The identified TADs with special reference to routes of transmission:

Foot and mouth disease (FMD):

FMD is an acute infectious viral disease which spreads very quickly if not controlled. It causes fever, followed by the development of blisters, chiefly in the mouth and feet of cloven-footed animals, such as cattle, sheep, pigs and deer. Sudden lameness is most prominent symptom in sheep, goat and pigs. The interval between exposure to infection and the appearance of symptoms varies between twenty-four hours and ten days, or even longer. The average time, under natural conditions, is three to six days.

While Foot and mouth disease is not normally fatal to adult animals, it is debilitating and causes significant loss of productivity; for example milk yields may drop or the animals may become lame. In young animals it can be fatal on a large scale.

The annual direct loss in India due to the disease has been estimated at INR 20000 Cr (USD 4.45 billion) and more than 527 million livestock (cattle, buffalo, sheep, goat and pigs) are at risk[8].

India is targeting to establish one or more clearly defined zones to attain freedom from FMD with vaccination status by 2020.
Following is the disease transmission routes from animal to animal:

- Direct contact (animal-to-animal contact at mucous membranes, cuts or abrasions).
- Indirect contact (such as contaminated bedding)
- Ingestion (contaminated feed)
- Respiratory or airborne (inhalation of infectious aerosols). Note: Skin cells shed from livestock infected with foot and mouth disease can also spread the disease.
- The boots, clothing and hands of a stockman who has attended diseased animals.
- Trucks, lorries, market places, and loading ramps – in or over which infected animals have travelled.
- Roads may also become contaminated and virus may be picked up and carried on the wheels of passing vehicles.
- Contaminated facilities used for holding animals.
- Common drinking water sources.
- Contact with infected carcasses.
- From infected raw meat and milk products (only in the context of transmission to susceptible animals as human is not affected by the virus)

[8] Bandyopadhyay (2003) ; Prabu et al (2004)

Peste des petits ruminants (PPR) or goat plague, or kata:

PPR is a severe, fast-spreading disease of mainly domestic small ruminants e.g. sheep, goat. It is characterized by the sudden onset of depression, fever, discharges from the eyes and nose, sores in the mouth, disturbed breathing and cough, foul-smelling diarrhoea and death. The disease can be differentiated from FMD mostly by presence of breathing problems and diarrhoea.

It is generally accepted that there is no carrier state; however, cases of PPR may spread the infection during the incubation period which is around 4-5 days. In case of severe infection the death follows, usually after 5–10 days.

The disease causes significant economic losses in terms of morbidity, mortality, and loss of productivity due to trade restriction. Annual losses due to this disease have been estimated at approximately INR 1,800 million (US$ 39 million)[9] with more than 200 million small ruminants at risk.

Transmission of this disease is by close contact, and confinement seems to favour outbreaks. Secretions and excretions of sick animals are the sources of infection. The virus does not survive long outside the host.

It is to be noted that movement of several migratory flocks of goats and sheep across the country commonly act as primary source of spread of infection. Control of the disease in the home tracts of important breeds is very important as they act as source of animals to the many upcoming commercial goat farms in the country.

Classical swine fever (CSF) or hog cholera (HC):

It is an economically important, highly contagious disease of domestic and feral swine (Pig) caused by the CSF virus (CSFV).

The CSF is manifested in four different forms: (i) The per-acute form resulting in a high morbidity and death within 5 days post infection, (ii) the acute form terminating in death between 10 and 20 days post-infection, (iii) the sub-acute form terminating in death between 20 and 29 days post-infection and (iv) the chronic disease, having a duration of 30 or more days.

Typical acute CSF cases are characterized by dullness, poor appetite and high fever (up to 40-41°C) within 2-6 days with usual peak between 4th and 8th day of illness, followed by exudative conjunctivitis (oozing of fluid and inflammation of conjunctiva of Eye) and huddling of animals in a corner of the pen. Chronically sick pigs often suffer from a partial loss of hair characterized by thinning of bristles. There is evidence of general depression and

[9] Kumar et al (2004) and Venkataramanan et al (2005)

unthriftiness, emaciation with or without diarrhoea, persistent mild fever and terminal deep purple colouration of the abdominal skin.

India for the year 2010-11, CSF outbreaks was recorded in 6 of the 14 States where surveillance was conducted. Maximum number of outbreaks occurred in Assam (159) followed by Meghalaya (18), Manipur (17), Madhya Pradesh (8), Rajasthan (3) and Maharashtra (2)[10]. One of the major issues in control of CSF is the gap in demand and availability of vaccines which is 22.26 million doses per year[11].

A 2011 participatory epidemiological study conducted in Assam, Nagaland and Mizoram by the International Livestock Research Institute (ILRI) showed that pig farmers in India incur huge losses from mortality, treatment and replacement costs which is estimated at over 2 billion Indian rupees (INR) each year. It is to be noted that India's 11.13 million pigs are at risk from CSF.

The pig is the only natural host. The virus spreads from infected or carrier pigs via discharges from the nose, mouth, urine and faeces or infected semen. The virus survives in frozen carcasses for long periods of time.

[10] PD_ADMAS, Bengaluru, GoI

[11] ICAR (2011)

Annexures IX-XI (Details of Risk analysis of study areas and in – country livestock markets)

Annexure-IX

(Risk scoring of border administrative divisions in UP)

State: Uttar Pradesh

Sl No	Area Sampling Frame (Divisions touching borders)	Criteria for Selection (1=Selected and 0=Not Selected)										
		Observed general traffic in case of Cross border Movement of people/animals	Concentration of Livestock	Presence of common grazing land (across borders) or transhumance movement	Absence of border check post	Absence of reserved forest area	Absence of border fencing	Available published reports of Livestock smuggling	Presence of predominant livestock markets	Presence of known routes of livestock movement	Presence of Land Custom Station	Total Score
	District: Pilibhit											
1	Puranpur	0	0	0	0	0	1	0	0	0	0	1
	District : Lakimpur Kheri											
2	Nighasan	0	0	0	0	0	1	0	0	0	1	2
3	Palia	0	0	0	0	0	1	0	0	0	1	2
	District: Bahraich											
4	Nanpara	0	0	0	0	0	1	0	0	0	1	2
	District: Balarampur											
5	Tulsipur	0	0	0	0	0	1	0	0	0	1	2
6	Balarampur	0	1	0	0	0	1	0	0	0	0	2
	District: Siddhartnagar											
7	Shohratgarh	0	0	0	0	0	1	0	0	0	1	2
8	Naugarh	0	1	0	0	0	1	0	0	0	0	2
	District: Maharajganj											
9	Nautanwa	1	1	0	0	1	1	1	1	1	1	8
10	Nichlaul	1	0	0	1	1	1	1	1	1	0	7
11	Pharenda	0	0	0	0	0	1	0	0	0	1	2
	District : Shrawasti											
12	Bhinga	1	1	0	0	0	1	1	1	1	0	6

Land Custom Stations : Gariphanta, Tikonia , Katarniaghat, Nepalganj Road, Jarwa, Barhni, Khunwa, Nautanwa-Sonauli

Annexure –X

(Risk scoring of border administrative divisions in Bihar)

Core Investigation Area

State: Bihar

Sl No	Area Sampling Frame (Divisions touching borders)	Criteria for Selection (1=Selected and 0=Not Selected)										Total Score
		Observed general traffic in case of Cross border Movement of people/animals	Concentration of Livestock	Presence of common grazing land (across borders) or transhumance movement	Absence of border check post	Absence of reserved forest area	Absence of border fencing	Available published reports of Livestock smuggling	Presence of predominant livestock markets	Presence of known routes of livestock movement	Presence of Land Custom Station	
District: Soupaul												
1	Nirmali	1	1	1	0	0	1	1	0	1	1	7
2	Basantpur	1	1	0	0	0	1	0	1	1	1	6
District : Araria												
3	Narpatganj	1	1	0	0	0	1	0	1	1	0	5
4	Forbesganj	1	1	0	0	0	1	1	1	1	1	7
5	Kursakatta	1	1	1	0	0	1	0	1	1	0	6
6	Sikti	1	1	0	0	0	1	0	0	1	0	4
District: Kishanganj HQ:												
7	Terhagachh	1	1	1	0	0	1	0	1	1	0	6
8	Dighalbank	1	1	0	0	0	1	0	0	1	0	4
9	Thakurganj	1	0	0	0	0	1	0	1	1	1	5
District: Madhubani HQ												
10	Madhwapur	1	0	0	0	0	1	0	1	1	0	4
11	Harlakhi	1	1	1	0	0	1	0	1	1	0	6
12	Basopatti	1	1	0	0	0	0	0	1	1	0	4
13	Jainagar	1	1	1	0	0	1	1	0	1	1	7
14	Ladania	1	1	0	0	0	1	0	0	1	0	4
15	Laukaha	1	1	1	0	0	1	0	1	1	0	6
16	Laukahi	1	1	1	0	0	1	0	1	1	0	6
District: Sitamarhi HQ:												
17	Bargania	1	1	1	0	0	1	0	0	1	1	6
18	Majorganj	1	1	1	0	0	1	0	0	1	0	5
19	Sonbarsa	1	1	1	0	0	1	0	1	1	1	7
20	Parihar	1	1	0	0	0	1	0	1	1	0	5
21	Sursand	1	1	0	0	0	1	0	0	1	1	5
District: Purba Champaran												
22	Raxaul	1	0	0	0	0	1	1	0	1	1	5
23	Adapur	1	1	1	0	0	1	0	1	1	0	6
24	Bankatwa	1	1	0	0	0	1	0	0	1	0	4
25	Ghorasahan	1	1	0	0	0	1	0	1	1	0	5
26	Dhaka	1	1	0	0	0	1	0	1	1	0	5
District: Pashchim Champaran HQ:												
27	Sidhaw	1	1	1	0	1	1	0	0	1	0	6
28	Ramnagar	1	1	1	0	0	1	0	0	1	0	5
29	Gaunaha	1	1	1	0	0	1	0	1	1	0	6
30	Mainataur	1	1	0	0	0	1	0	0	1	0	4
31	Sikta	1	1	1	0	0	1	0	1	1	0	6

Risk scoring of-country Livestock markets in Bihar

Sampling of in country livestock markets based on criteria based scoring					
State: Bihar					
Serial Number	Name of the Livestock market with administrative division	Criteria			Total Score
		Volume of Trade in number of live animal traded (1=>1500)	Number of Feeding clusters to that market (1=>5)	Linkage to international border trade (1=Yest)	
1	2	4	5	6	
District: Khagaria					
1	Mansi (Mansi)	1	1	1	3
District: Buxar					
2	Chausa (Chausa)	0	1	0	1
3	Brahmpur (Buxar)	1	1	0	2
District: Saran					
4	Hathua (Saran)	1	1	0	2
5	Revelganj (Revelganj)	1	1	0	2
District: Patna					
6	Fatwah(Fatwah)	1	1	1	3
7	Shahpur Maner (Maner)	1	1	0	2
8	Brahmpur (Buxar)	1	1	0	2
District: Muzaffarpur					
9	Hardi (Muzaffarpur)	1	1	1	3
District: Vaishali					
10	Bhadoul (Vaishali)	1	1	0	2
District: Gaya					
11	Bhusanda (Gaya)	1	1	0	2
12	Devkund (Gaya)	1	1	0	2
District: Purnia					
13	Banmankhi (Banmankhi)	1	1	1	3
14	Kasba (Kasba)	1	1	1	3
15	Gulabbag (Purnia)	1	1	1	3
16	Dagarua (Dagarua)	1	1	1	3
District: Kathihar					
17	Kheriahat (Korha)	1	1	1	3
18	Mansahi (Mansahi)	1	1	0	2
19	Sonali (Kadwa)	1	1	1	3
20	Mallikpur (Balarampur)	1	1	1	3

Annexure-XI
(Risk scoring of border administrative divisions in WB)

Sampling of Core Investigation Area

State: West Bengal

Sl No	Area Sampling Frame (Divisions touching borders)	Criteria for Selection (1=Selected and 0=Not Selected)										
		Observed general traffic in case of Cross border Movement of people/animals	Concentration of Livestock	Presence of common grazing land (across borders) or transhumance movement	Absence of border check post	Absence of reserved forest area	Absence of border fencing	Available published reports of Livestock smuggling	Presence of predominant livestock markets	Presence of known routes of livestock movement	Presence of Land Custom Station	Total Score
	District: Darjilling											
1	Darjeeling Pulbazar	0	0	0	1	0	1	0	0	0	0	2
2	Jorebunglow	1	0	0	0	1	1	0	0	0	1	4
3	Mirik	1	0	0	0	1	1	0	0	0	0	3
4	Naxalbari	1	0	0	0	1	1	0	0	0	0	3
5	Kharibari	1	0	0	0	1	1	0	0	1	0	4
6	Phansidewa	1	0	0	0	1	0	1	0	1	1	5
7	Gorubathan	0	0	0	1	0	1	0	0	0	0	2
	District : Jalpaiguri											
8	Rajganj	0	0	0	0	1	0	0	0	0	0	1
9	Jalpaiguri	1	1	0	0	1	0	0	0	0	0	3
10	Nagrakata	0	0	0	1	0	0	0	0	0	0	1
12	Madarihat	0	0	0	0	1	0	0	0	0	0	1
13	Kalchini	1	0	0	0	1	0	0	0	0	0	2
14	Kumargram	0	0	0	1	0	0	0	0	0	0	1
	District: North 24 Paragana and South 24 Paragana											
15	Bagda	0	0	0	0	1	0	0	0	0	0	1
16	Bongoan	0	0	0	0	1	0	1	1	1	1	5
17	Gaighata	0	0	0	0	1	1	1	0	1	0	4
18	Swarupnagar	0	0	0	0	1	1	1	0	1	0	4
19	Baduria	0	0	0	0	1	1	0	0	0	0	2
20	Basirhat-I	0	0	0	0	1	1	1	0	1	1	5
21	Hasnabad	0	0	0	0	1	1	1	0	0	0	3
22	Hingalgang	0	0	0	0	1	1	0	0	0	0	2
23	Gosaba	0	0	0	0	1	0	0	0	0	0	1
	District: South Dinajpur											
24	Tapan	0	0	0	0	1	0	0	0	0	0	1
25	Balurghat	0	1	0	0	1	0	0	0	0	0	2
26	Hilli	1	0	0	0	1	0	1	0	1	1	5
27	Kumarganj	0	0	0	0	1	0	0	0	0	0	1
28	Gangarampur	0	0	0	0	1	0	0	0	0	0	1
29	Kushmundi	0	0	0	0	1	0	0	0	0	0	1
	District: North Dinajpur											
30	Chopra	0	0	0	0	1	0	0	0	1	0	2
31	Islampur	0	1	0	0	1	0	1	0	1	0	4
32	Goalpokhar-I	0	0	0	0	1	0	0	0	0	0	1
33	Karandighi	0	1	0	0	1	0	0	0	0	0	2
34	Raiganj	0	1	0	0	1	0	0	0	0	0	2
35	Hemtabad	0	0	0	0	1	0	0	0	0	0	1
36	Kaliyaganj	0	0	0	0	1	0	0	0	0	0	1
	District: Mushidabad											
37	Samsherganj	0	0	0	0	0	0	0	0	0	0	0
38	Suti-II	0	0	0	0	0	0	1	0	0	0	1
39	Suti-I	0	0	0	0	0	0	0	0	0	0	0
40	Raghunathganj-II	0	0	0	0	0	0	0	0	0	0	0
41	Lalgola	0	0	0	0	0	0	0	0	0	0	0
42	Bhagwangola-I	0	0	0	0	0	0	0	0	0	0	0
43	Bhagwangola-II	0	0	0	0	0	0	0	0	0	0	0
44	Raninagar-II	0	0	0	0	0	0	1	0	0	0	1
45	Jalangi	0	0	0	0	0	0	1	0	1	0	2
	District : Nadia											
46	Karimpur-I	0	0	0	0	0	0	1	0	0	0	1
47	Karimpur-II	0	0	0	0	0	0	0	1	0	0	1
48	Tehatta-I	0	0	0	0	0	0	1	0	1	0	2
49	Chapra	0	0	0	0	0	0	0	0	0	0	0
50	Krishnaganj	0	0	0	0	0	0	0	0	0	0	0
51	Hanskhali	0	0	0	0	0	0	0	0	0	0	0
52	Ranaghat-II	0	0	0	0	0	0	1	0	0	0	1
	District: Malda											
53	Bamangola	0	0	0	0	0	0	1	1	0	0	2
54	Habibpur	0	0	0	0	0	0	1	0	1	0	2
55	Malda-Old	0	0	0	0	0	0	0	0	0	0	0
56	English Banzar	0	0	0	0	0	0	0	0	0	0	0
57	Kaliachak-1											0
	District: Cooch Behar											
58	Haldibari	1	0	0	0	0	0	0	0	1	0	2
59	Mekliganj	1	0	0	0	0	0	0	0	1	1	3
60	Mathabnanga-I	0	0	0	0	0	0	0	0	0	0	0
61	Sitalkuchi	0	0	0	0	0	0	0	0	0	0	0
62	Sitai	0	0	0	0	0	0	0	0	0	0	0
63	Dinhata-I	0	0	0	0	0	0	0	0	0	0	0
64	Dinhata-II	0	0	0	0	0	0	0	0	0	0	0

Risk scoring of in-country livestock markets in West Bengal

Sampling of in-coutry livestock markets based on criteria based scoring					
State: West Bengal					
Sl No	Name of the Livestock market with administrative division	Criteria			Total Score
		Volume of Trade in number of live animal traded (1=>3000)	Number of Feeding clusters to that market (1=>5)	Linkage to international border trade (1=Yes)	
1	2	4	5	6	
District: Birbhum					
1	Sukhbazar (Illambazar)	1	1	1	3
2	Sainthia	1	1	1	3
3	Bhatsala More (Rampurhut-I)	1	0	0	1
4	Lohagar (Nalhati II)	0	0	0	0
5	Chatra (Murarai-I)	1	0	0	1
6	Paikar	1	0	0	1
7	Hiatnagar (Murarai-II)	1	0	0	1
District: Burdwan					
8	Guskara (Ausgram-I)	1	1	1	3
9	Seherabazar (Raina-I)	1	0	0	1
10	Mogra Hat (Memari-I)	1	0	0	1
11	Panchundi (Ketugram-II)	1	1	1	3
12	Khetura (Galsi-II)	1	0	0	1
District: Medinapur West					
13	Fekoghat (Gopiballavpur-II)	1	1	1	3
District: Bankura					
15	Laxmisagar (Simlapal)	1	1	1	3
District: Hoogly					
16	Pandua (Pandua)	1	1	1	3

Annexure-XII

(Risk scoring of border administrative divisions in Tripura)

Sampling of Core Investigation Area

State: Tripura

Sl No	Area Sampling Frame (Divisions touching borders)	Criteria for Selection (1=Selected and 0=Not Selected)										
		Observed general traffic in case of Cross border Movement of people/animals	Concentration of Livestock	Presence of common grazing land (across borders) or transhumance movement	Absence of border check post	Absence of reserved forest area	Absence of border fencing	Available published reports of Livestock smuggling	Presence of predominant livestock markets	Presence of known routes of livestock movement	Presence of Land Custom Station	Total Score
District: Khowai HQ: Khowai												
1	Tulashikhar	0	0	0	0	1	0	0	0	0	0	1
2	Khowai	1	1	0	0	0	1	0	1	0	1	5
3	Padmabil	0	0	0	0	1	0	0	0	0	0	1
District : West Tripura HQ: Agartala												
4	Hezamara	0	0	0	0	0	0	0	0	0	0	0
6	Mohanpur	0	0	0	0	0	1	0	0	0	1	2
District: Sipahijala HQ: Bishramgunj												
7	Dukli	0	0	0	0	0	0	0	0	0	0	0
8	Bishalgarh	0	1	0	1	0	0	1	0	0	0	3
9	Boxanagar	1	0	1	0	0	0	0	0	1	0	3
10	Melaghar	1	1	0	1	0	1	1	1	1	1	8
11	Kathalia	1	0	0	1	0	1	1	0	0	0	4
District: Dhalai HQ: Ambassa												
12	Salema	0	0	0	0	0	0	0	0	0	1	1
13	Ambassa	0	1	0	0	0	0	0	0	0	1	2
14	Dumbunagar	0	0	0	0	0	0	0	0	0	0	0
15	Chhawmanu	0	0	0	0	0	0	0	0	0	0	0
District: North Tripura												
16	Dasda	0	0	0	0	0	1	1	0	0	0	2
17	Kadamtala	0	1	0	0	0	1	0	0	0	0	2
District: South Tripura												
18	Rajnagar	0	0	0	0	1	1	0	0	0	0	2
19	Hrishyamukh	0	0	0	0	0	1	0	0	0	1	2
20	Satchand	0	0	0	0	0	1	0	0	0	1	2
21	Rupaichhari	0	0	0	0	0	0	0	0	0	0	0
District : Gomati HQ: Udaipur												
22	Karbuk	0	1	0	0	0	1		0	0	0	2
District: Unokoti, HQ: Kailashahar												
23	Kumarghat	0	0	0	0	0	1	0	0	0	0	1
24	Gournagar	1	1	0	0	0	1	0	0	0	1	4

Risk scoring of in-country livestock markets in Tripura

Sampling of in country livestock markets based on criteria based scoring					
State: Tripura					
Serial Number	Name of the Livestock market with administrative division	Criteria			Total Score
		Volume of Trade in number of live animal traded (1=>500)	Number of Feeding clusters to that market (1=>5)	Linkage to international border trade (1=Yest)	
1	2	4	5	6	
District: South Tripura					
1	Barpathari (Belonia)	1	1	1	3
2	Laugagn (Santir bazzar)	1	1	0	2
District: Gomati					
3	Karbook	1	1	0	2
4	Natun bazzar (Amarpur)	1	1	0	2
5	Dalak (Amarpur)	1	1	0	2
6	Tulamura (Udaipur)	1	1	0	2
7	Garji (Udaipur)	0	0	0	0
8	Jamjuri (Udaipur)	1	1	1	3
District: West Tripura					
9	Charilam (Bishalghar)	1	1	0	2
10	Melaghar (Melaghar)	1	1	1	3
11	Rani bazar (Jirania)	1	1	0	2
12	Tealiamura (Teliamura)	1	1	0	2
District: Khawai					
13	Bagan bazar (Khowai)	0	1	0	1
District: Dhalai					
14	Kulai (Ambassa)	1	1	0	2
15	Machli (Manughat)	1	1	1	3
District: North Tripura					
16	Ramnagar (Dharmanagar)	1	1	1	3
17	Machmara (Kumarghat)	1	1	0	2
18	Kadamtala (Dharmanagar)	0	0	1	1
* A in-country livestock market in case of Tripura is defined as market situated at-least 10 km from actual border area.					
Selected Markets: Barpathari, Jamjuri, Melaghar, Machli, Ramnagar					

Annexure-XIII

(Risk scoring of border administrative divisions in Assam)

Core Investigation Area

State: Assam

Sl No	Area Sampling Frame (Divisions touching borders)	Criteria for Selection (1=Selected and 0=Not Selected)										
		Observed general traffic in case of Cross border Movement of people/animals	Concentration of Livestock	Presence of common grazing land (across borders) or transhumance movement	Absence of border check post	Absence of reserved forest area	Absence of border fencing	Available published reports of Livestock smuggling	Presence of predominant livestock markets	Presence of known routes of livestock movement	Presence of Land Custom Station	Total Score
	District: Dhubri											
1	Mankachar	1	0	0	0	1	0	0	0	0	0	2
2	South Salmara	1	1	0	0	0	1	0	1	0	1	5
3	Golakganj											
4	Agomoni											
5	Dhubri	0	0	0	0	1	0	0	0	0	0	1
	District : Karimganj											
6	Badarpur	0	0	0	0	1	0	0	0	0	0	1
7	Patharkandi	1	1	1	0	0	1	1	1	1	0	7
8	Nilambazar	1	1	1	0	1	0	1	1	1	0	7
9	Karimganj	0	1	1	0	1	1	0	1	0	1	6
	District: Cachar											
10	Katigora	1	1	1	0	0	0	1	1	1	0	6
	District: Chirang											
11	Bengtal	1	1	1	0	0	1	1	1	1	1	8
12	Bijni	0	1	0	1	0	1	0	1	0	0	4
	District: Baska											
13	Barnagar	1	1	0	0	0	1	0	1	1	0	5
14	Baksa	0	1	0	1	0	1	0	1	0	0	4
15	Baganpara	0	1	0	1	0	1	0	0	0	0	3
16	Tamulpur	1	1	1	0	0	1	1	1	1	1	8
17	Jalah	1	1	1	0	0	1	0	1	1	0	6
	District: Kokrajhar											
18	Gosaigaon	1	1	1	0	0	1	1	1	1	0	7
19	Kokrajhar	1	1	1	0	0	1	0	1	0	0	5
	District :Udalguri											
20	Harisinga	0	1	0	1	0	1	0	0	0	0	3
21	Udalguri	0	1	0	1	0	1	0	0	0	0	3

Risk scoring of in-country livestock markets in Assam

Sampling of in country livestock markets based on criteria based scoring

State: Assam

Serial Number	Name of the Livestock market with administrative division	Criteria			Total Score
		Volume of Trade in number of live animal traded (1=>500)	Number of Feeding clusters to that market (1=>5)	Linkage to international border trade (1=Yest)	
1	2	4	5	6	
	District: Kamrup (More in to Ribhoi dist of Meghalaya)				
1	Na mile cattle market	1	1	0	2
2	Mangaldoi	1	1	0	2
	District: Dhubri				
3	Gauripur	1	1	1	3
	District: Karimganj				
4	Kaliganj	1	1	1	3
10	Anipur	1	1	1	3
	District: Kamrup Rural				
13	Tulsibari	1	1	1	3

Annexures XIV-XIIII (Example of animal movement reports and Tally sheets for observation)

Annexure-XIV
Report of cross –border animal movement
(Bihar and Nepal)
District: Supaul

Place: Nirmali

Gist of the Report:

The road towards north from Majhari chowk in NH 57 leads to border area of Kunauli (28 km from NH 57) with SSB border check point at Dagmara (Fig1 point A: Majhari Chowk Point B: Kunauli). Kunauli has a border market of normal goods where people from both the countries trade. The district of Nepal touching this border is Saptari (Eastern Development Region) and the main Township in Nepal is Rajbiraj.

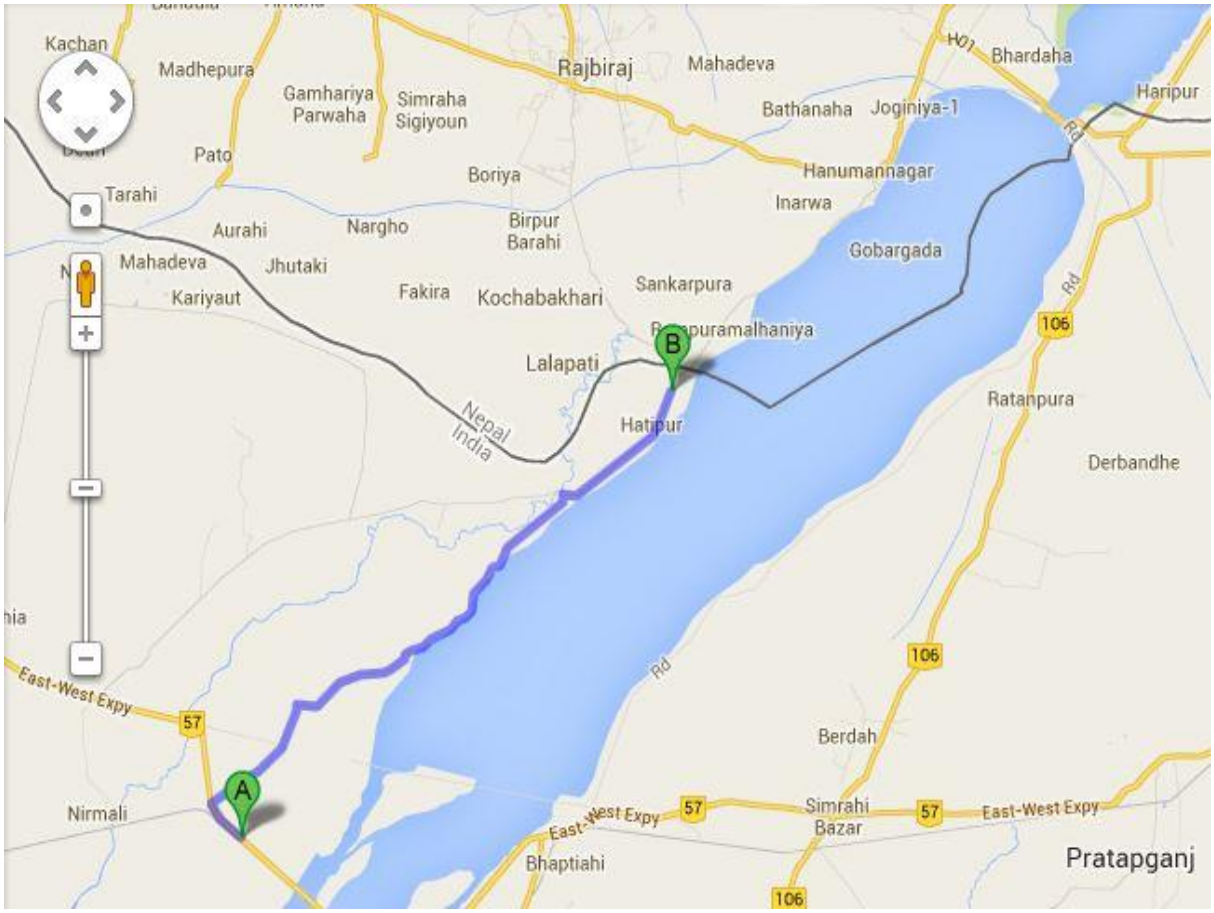


Figure 1 Showing road from Majhari Chowk in NH57 (A) to Kunauli (B) bordering Nepal

There is a religious place viz. Baba Balkhandi Mandir near Kunauli (26°26'16"N 86°46'16"E). This mandir is surrounded by open grazing area called "chakla pokhar" where farmers and small traders from villages in Nepal side bring animals for grazing. This is a place where traders clinch their deals and animals are taken to Raghopur (Fig.2) and Supaul livestock market. Raghopur livestock market is a relatively big market with size up to 2000 animals in a market day e.g. Monday and Thursday.

Figure 2 Raghopur Livestock Market (Point A) 3km south of Simrahi chowk near Raghupur station.

Open riverine area (viz. Bathnaha Palar and Dharhara Palar) near Indian village Bathnaha is also used to aggregate animals from different villages of Nepal.

Majhari chowk and adjacent areas are also a halting point for animals moving from far places Madhubani, Sitamarhi etc.

Place: Basantpur (Birpur)

32 km north of Simrahi chowk in NH 57 is Birpur chowk. From here one road goes to Bhimnagar barrage and Bhantabari border market. Near Bhimnagar barrage (Fig 3) is a village in Nepal side called Bhardaha. Animals from different places of Nepal cross this village and take a route up to Raghupur livestock market (Fig 2) via Indian villages like Raniganj, Chhitahi touching Simri administrative division.

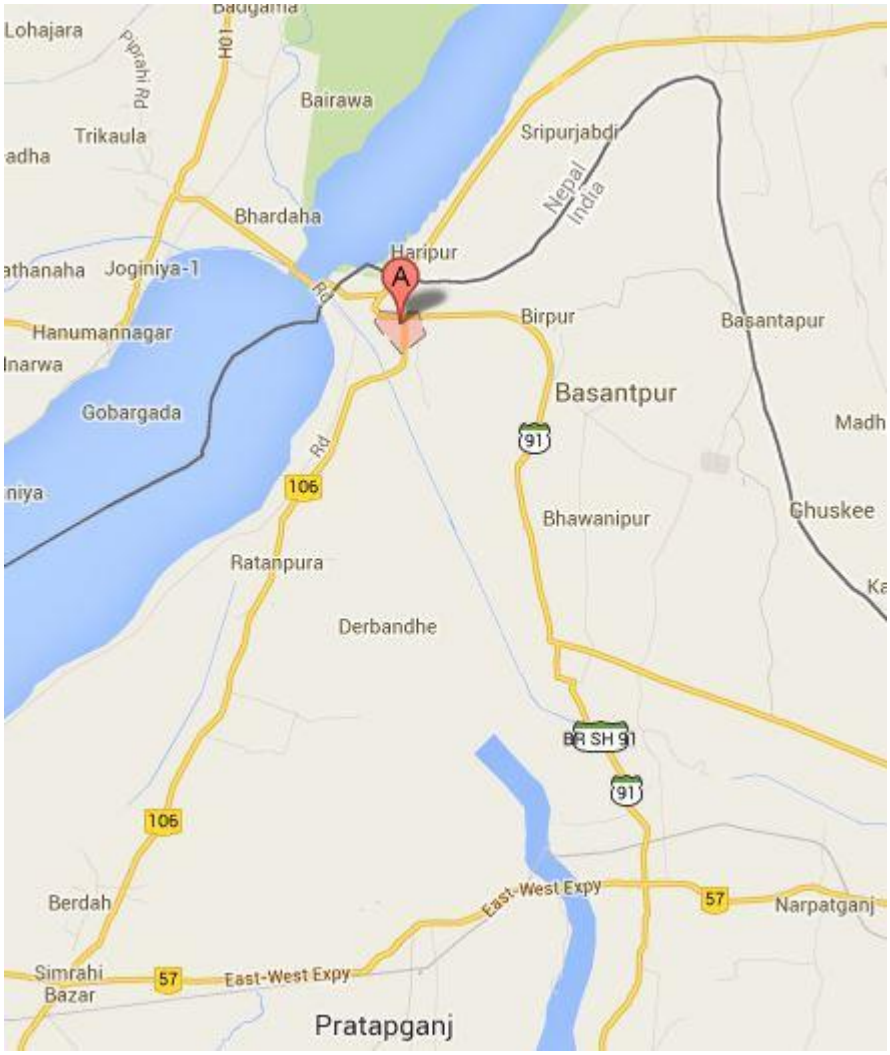


Figure 3 Bhimnagar Barrage (A) on river Koshi in Nepal border

District: Araria

Location: Jogbani

Fifteen km from Forbesganj chowk of NH 57 is Jogbani (Fig 4) which is a land custom station and border check post. It touches Biratnagar of Nepal. The area has a rail station too. Rani bazaar market falls on both sides of the border. The area is densely populated on both the sides. Visit to various places viz. Indra nagar, Dharamsala, Thakurbari, Sahebganj, Sonapur, Sursar, Targama godown of Indian side of border indicated no organized cross-border movement of animals. There are however, small cattle markets near Jogbani like Phulkaha and Bathnaha.

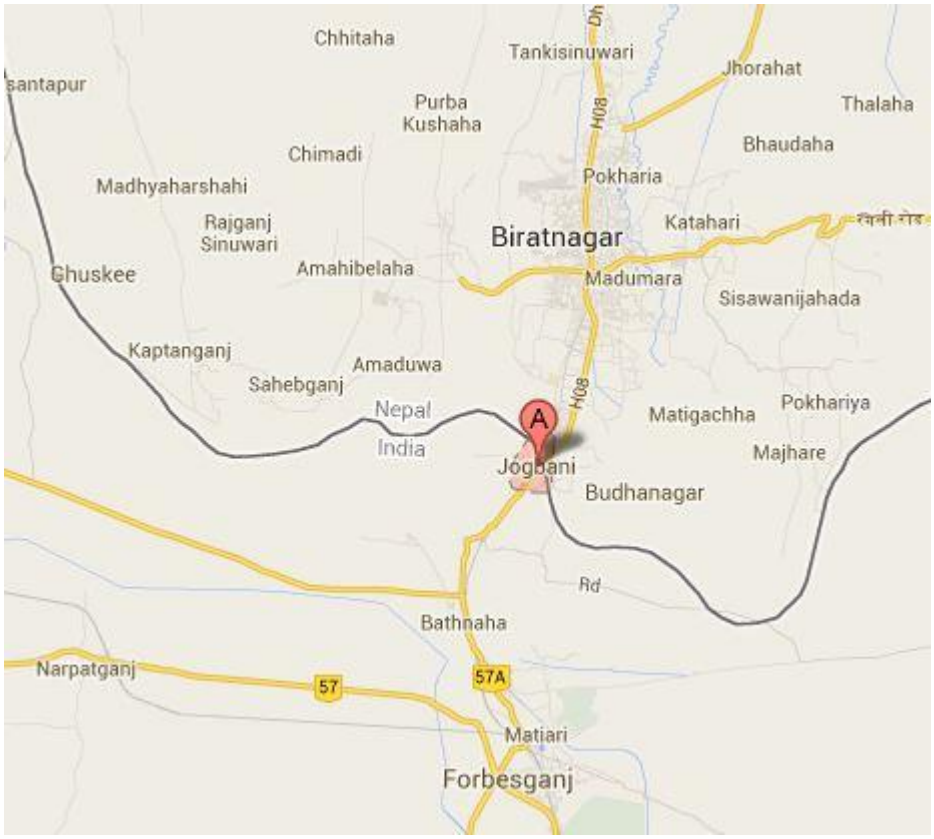


Figure 4 Jogbani (Point A) 15 km North of Forbesganj in NH 57

Location: Forbesganj

There is a large weekly livestock market at Forbesganj marketing yard located within 1km north of NH 57 near railway station. The market days are Tuesday and Saturday. In the month of November this weekly market converts itself to a month long livestock and general fair. The market receives animals from various places including far of districts like Soupoul, Sitamarhi, Madhubani, Darbhanga, Motihari, Saharsa etc.

Location: Narpatganj

The field team could identify a short route of around 16 km from Birpur of Supaul district to Forbesganj crossing border areas of Narpatganj like Karzain etc. (Fig 5). Most part of this route is along-side the open border and used for both in-country and cross border animal movement mostly on foot.

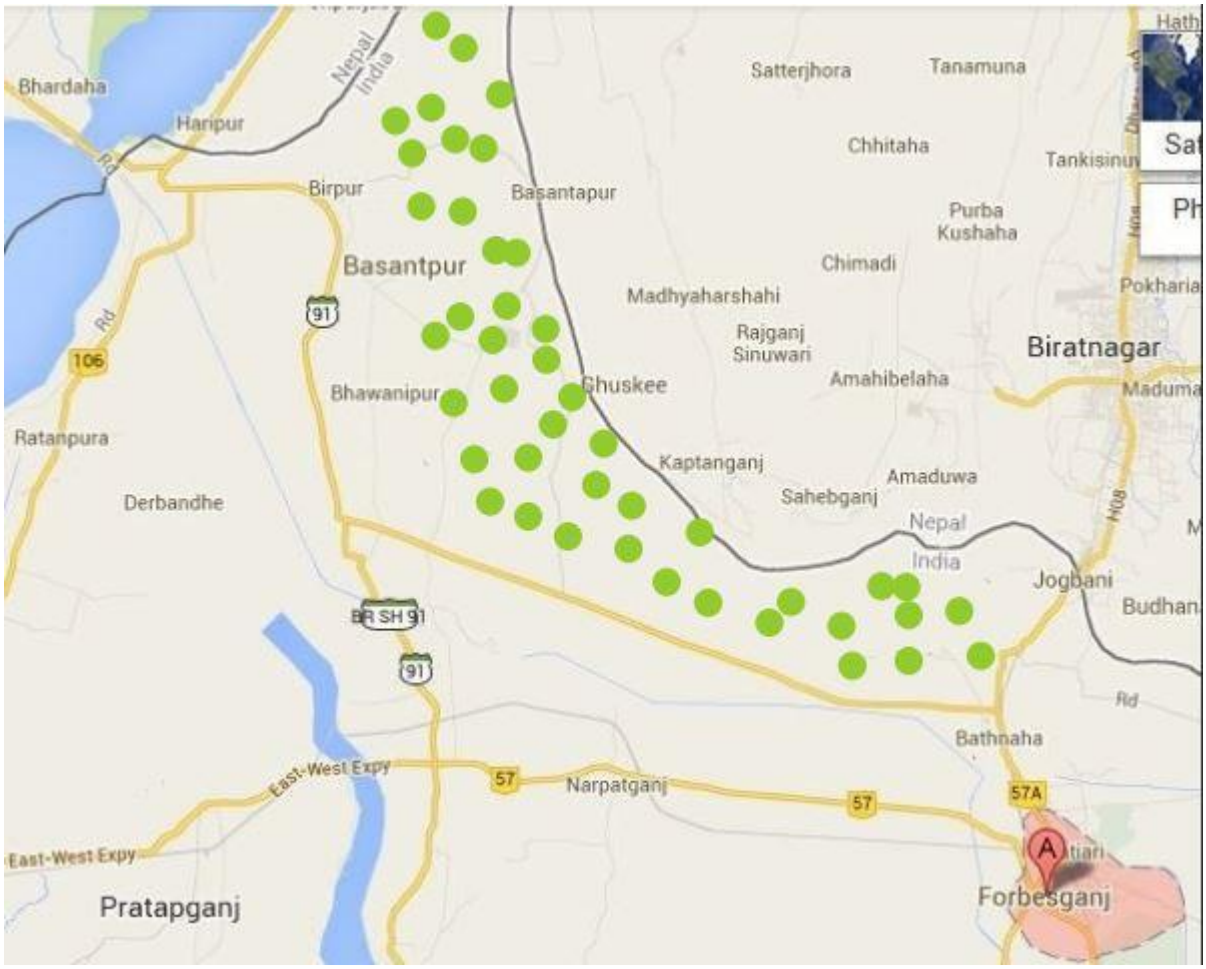


Figure 5 Green dots indicating open border areas in Narpatganj division where animal movement on foot takes place from Birpur to Forbesganj.

The division as such is not important in the context of animal trade though there is a small weekly cattle market near railway station.

Location: Araria town (District HQ)

The field team could observe crossing of large number loaded vehicles with animals (mostly after 4pm till late night) at Gachibari chowk, near Araria town on route to West Bengal via Bahadurganj / Kishanganj. Fig 6 shows the routes vis-a-vis important places like Araria, Bahadurganj and Kishanganj

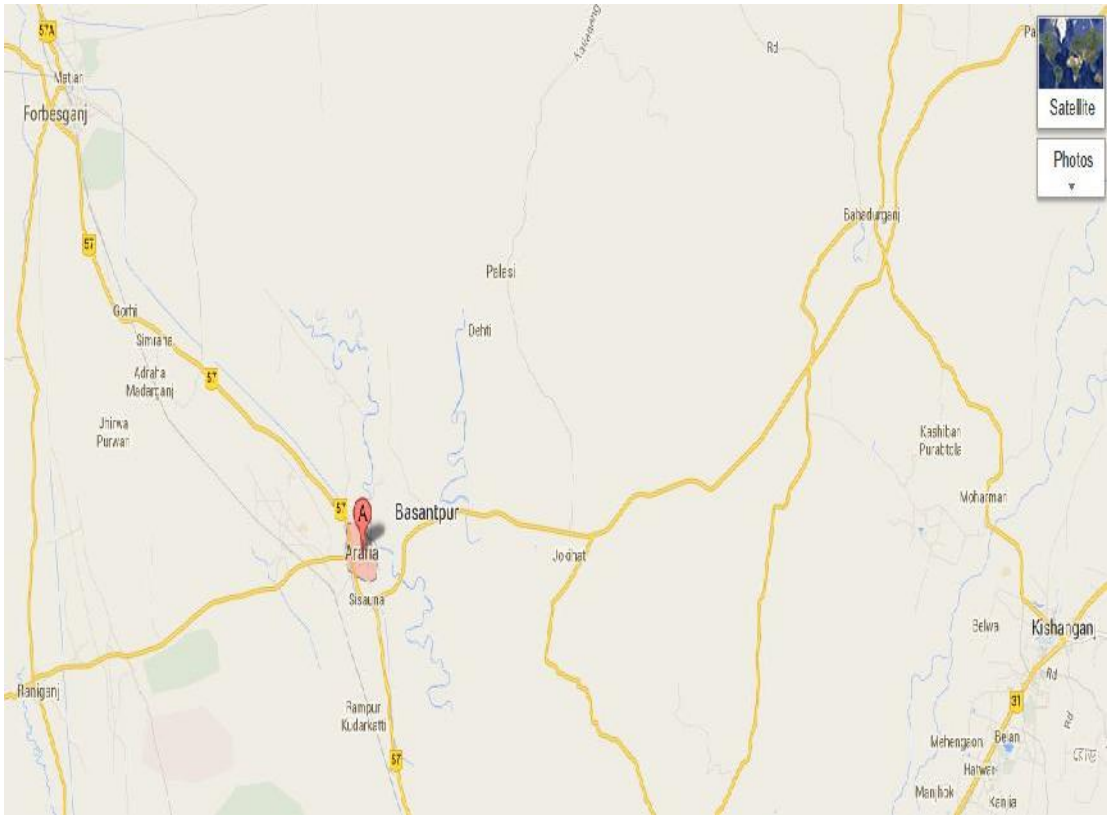


Figure 6 Animal movement Routes from Araria to Bahadurganj and Kishanganj on way to West Bengal.

Location: Kursakatta.

Thirty two km north from Gachibari chowk of Araria near NH 57 leads to Kursakatta. (Point A Fig 7)

Figure 7 showing the location of Kursakatta (Point A) and Sikti

There are two weekly cattle markets within the division viz. Hutta chowk and Rampur. These markets receive animals from Nepal almost regularly. The animals from Nepal cross border at villages viz. Kunwari, Garaiyah, Lelekhan. The name of border district of Nepal touching this division is Morang.

There are numerous village roads which are used for animal movement on foot from Kursakatta via Sikti up to Thakurganj (around 35 km) before animals enter into West Bengal.

Location: Sikti

Around 15 km from Kursakatta towards north is Sikti division of Araria district. Field team could observe large number of cattle on the road from Kursakatta to Sikti. On enquiry, ownership of these animals could not be established.

The division on three sides has open border with Nepal. Some of the important villages in the context of animal movement include Majrakh, Kharbanna etc. The area in other side of the border is Dhanapatti division of Morang district of Nepal. There is no organised cattle market in this division.

Annexure-XV (The Tally Sheets for observation)

.

Tally Serial Sheet Number:

OSRO/RAS/901/EC: **Livestock Value chain study for control of TAD**

Tally sheet for Livestock movement volume count

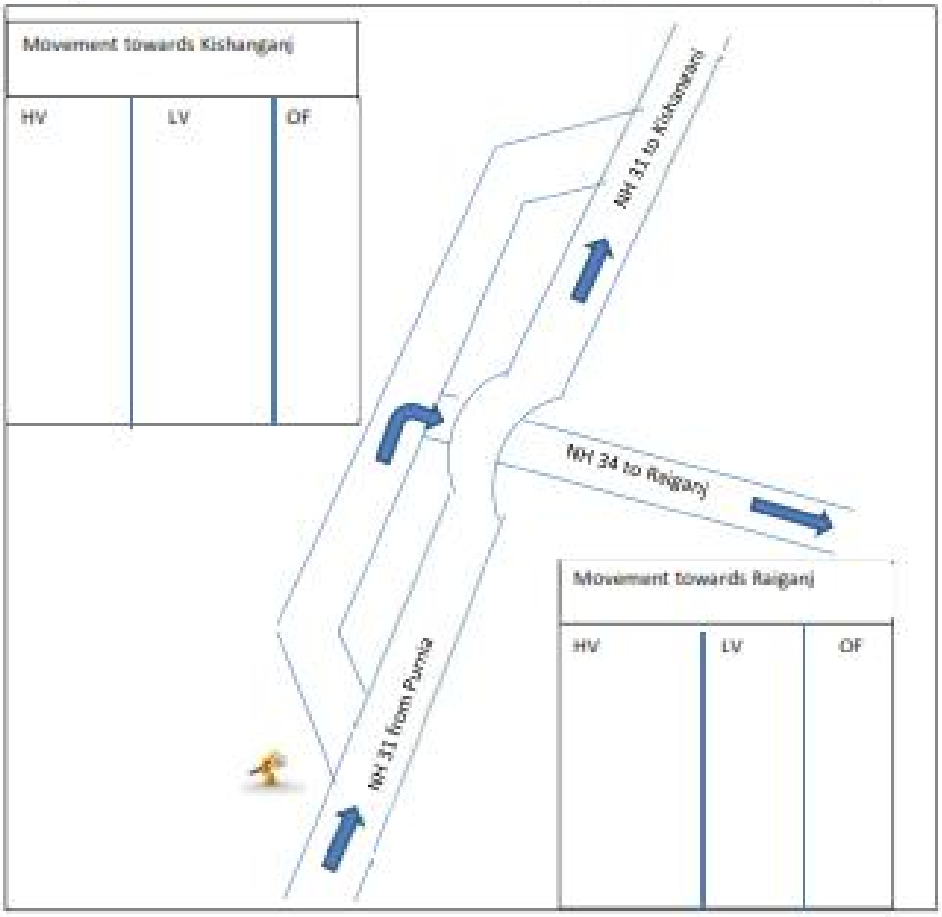
Location: **Dalkhola** (N 25°52'58.9'' E 087°40'17.1'')

HV: Heavy Vehicle MV: Medium Vehicle OF: On Foot

Time.....30 .....

Date:

Observer:



Place for observer note (If any):

Note: Each tally sheet should be used for two hour period.

Use tally sign to mark numbers.

Observation Point

Tally Serial Sheet Number:

OSRO/RAS/901/EC: **Livestock Value chain study for control of TAD**

Tally sheet for Livestock movement volume count

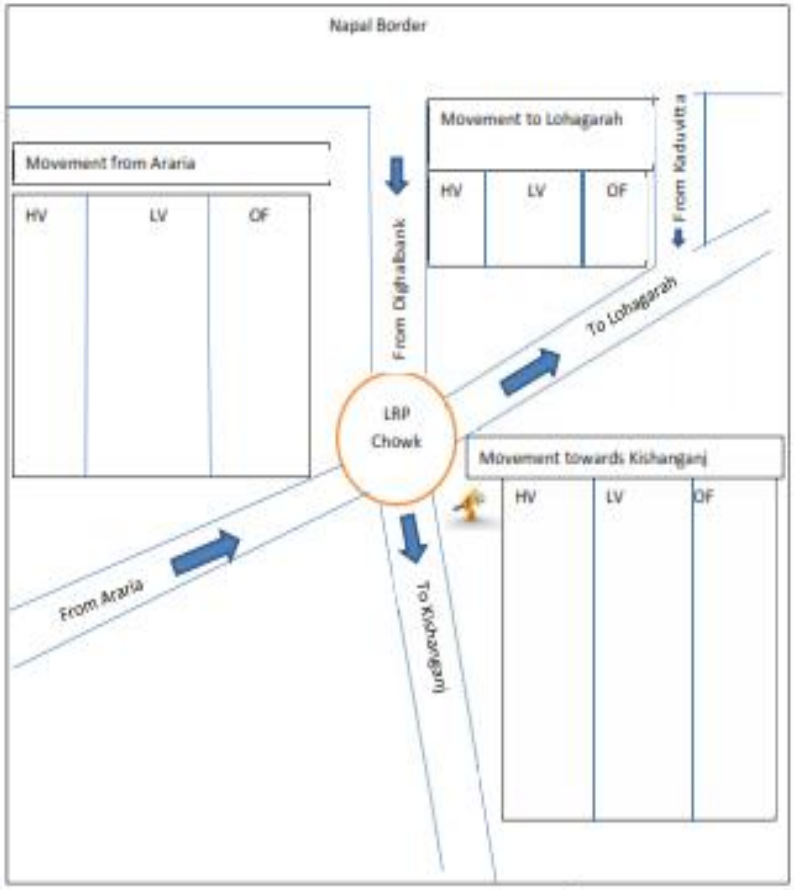
Location: **Bahadurganj** (N 26°14'46.8'' E 087°40'51.7'')

HV: Heavy Vehicle MV: Medium Vehicle OF: On Foot

Time.....to .....

Date:

Observer:



Place for observer note (If any):

Note: Each tally sheet should be used for two hour period.

Use tally sign to mark numbers.

Observation Point

Tally Serial Sheet Number:

OSRO/RAS/901/EC: **Livestock Value chain study for control of TAD**

Tally sheet for Livestock movement volume count

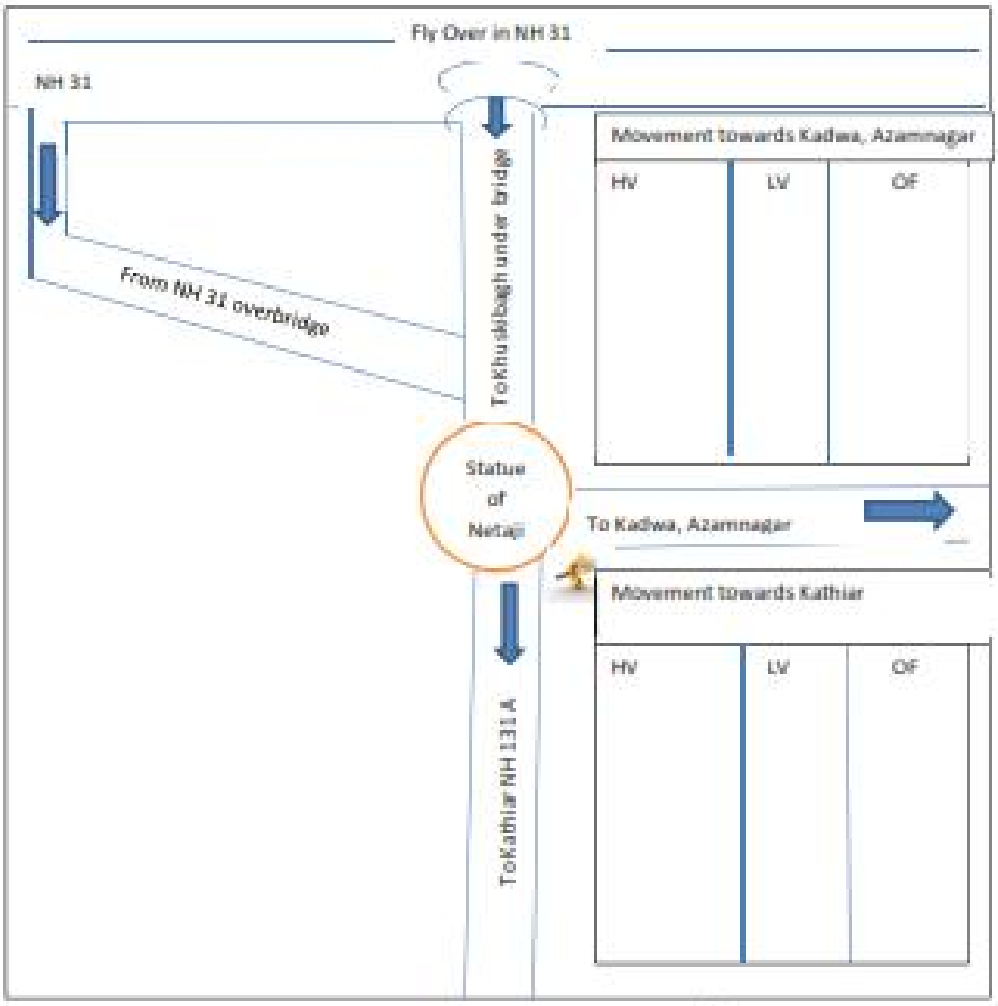
Location: **Bilauri More** (N 25°45'59.0" E 087°30'54.7")

HV: Heavy Vehicle MV: Medium Vehicle OF: On Foot

Time.....to .....

Date:

Observer:



Place for observer note (If any):

Note: Each tally sheet should be used for two hour period.

Use tally sign to mark numbers.

Observation Point

Tally Serial Sheet Number:

OSRO/RAS/901/EC: **Livestock Value chain study for control of TAD**

Tally sheet for Livestock movement volume count

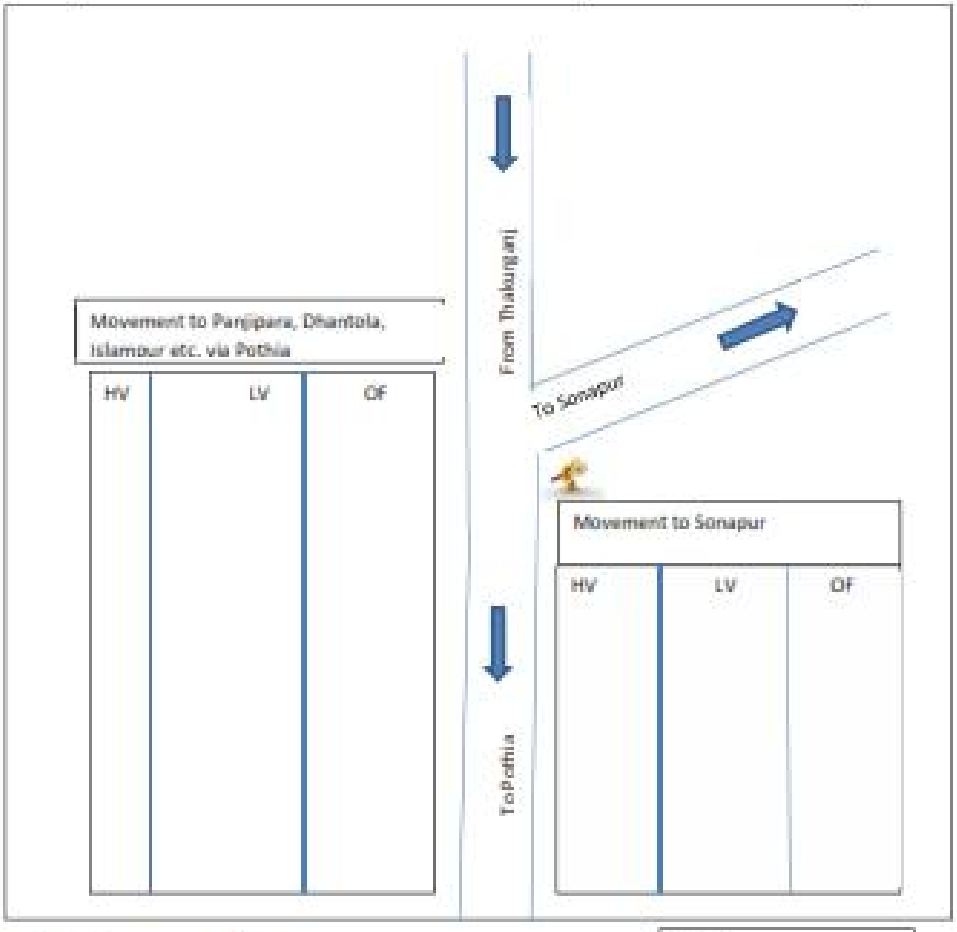
Location: **Taiabpur More** (N 26°23'17.1" E 088°80'30.9")

HV: Heavy Vehicle MV: Medium Vehicle OF: On Foot

Time.....to .....

Date:

Observer:



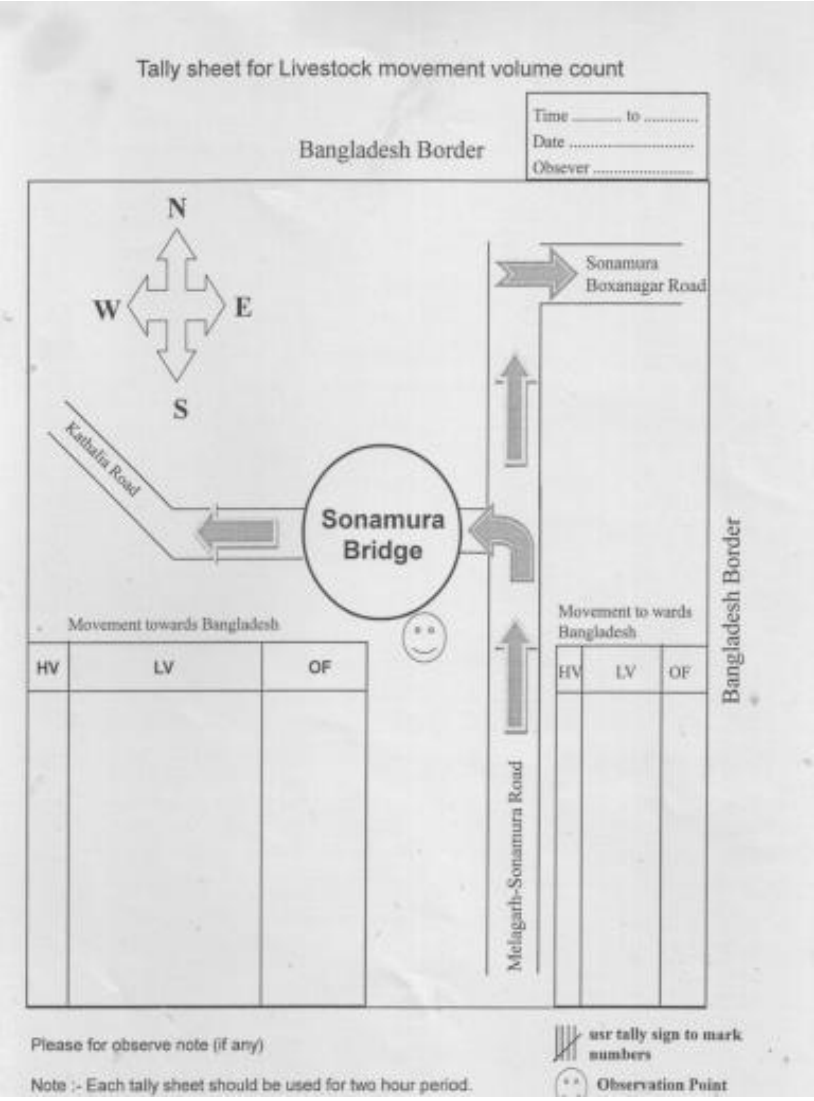
Place for observer note (If any):

Note: Each tally sheet should be used for two hour period.

Use tally sign to mark numbers.

Observation Point

Tally sheet for Melaghar, Tripura



Annexure-XVI (Excerpt of published report)

Illegal cattle trade funding terror

(Source: http://timesofindia.indiatimes.com/india/Illegal-cattle-trade-funding-terror/articleshow/3554048.cms?referral=PM)

The author has posted comments on this article Manjari Mishra, TNN | Oct 3, 2008, 03.21AM IST

LUCKNOW: What has for past several years appeared an innocuous even if an illegal side "business", namely cattle trade, could be a source of terror funding, say top UP government officials. A substantial part of the Rs 15,000 crore illegal trades is being funnelled to fund terror, officials said.

The connection between cattle smuggling and big crime first came to light when one Mizanur Rehman turned out to be the key accused in the kidnapping of Kolkata-based proprietor of Khadim Shoes, Partho Burman. Mizanur's younger brother, Azizur Rehman Sardar, 22, was found to be a Harkat-ul-Jihad-e-Islami (HuJI) activist serving time in Lucknow jail.

Mizanur was also known to be the trusted aide of HuJI area commander Jalaluddin, alias Babu Bhai, who too is in Lucknow jail. A part of the Rs 4 crore ransom in the Burman abduction case was suspected to have been diverted to Omar Sheikh, one of the alleged killers of US journalist Daniel Pearl in Pakistan.

Azizur Rehman is in the slammer for ferrying arms and explosives from Bangladesh to India (his last cache included 2 kg RDX, 10 grenades and 10 detonators). Before that, however, this West Bengal resident, operated as a cattle smuggler along the India-Bangladesh border. So do his other three associates arrested with him in June 2007.

Azizur is one of the hundreds of foot soldiers in cross-border terror network who engages in cattle smuggling during "lean period".

Unlike fake Indian currency notes (FICN), narcotics and arms peddling, cattle smuggling is the least known and supposedly least glamorous terror funding tactic, largely below the intelligence scanner. It's also a highly dependable means of sustaining "peripherals" and recruits who form the most active chain in the terror link.

The thriving racket through, as a source puts it, "68 smuggling corridors and 149 sensitive villages dotting West Bengal border along the 1,485 km long India-Bangladesh border" has been worrying UP and West Bengal governments for over a decade.

The point was brought home by the animal welfare division of the ministry of environment and forest. In a letter forwarded to the ministry of home affairs, the department highlighted "serious problem of hawala transactions in lieu of smuggled cattle in Chittagong area". The money, the letter emphasised, "funds Islamic terror groups and their sleeper agents in the country….National security demands that cattle smuggling to Bangladesh end at once." Based on these inputs, MHA has alerted state governments.

UP government had shown similar concern over the issue two years ago. On August 26, 2006, then director-general of police Bua Singh quoting secretary, border management, MHA, had claimed in a circular that "animals smuggled from West Bengal border number as high as 50 lakh to 60 lakh a year". It also noted that "officers in Bangladesh regularize this illegal smuggling of cattle by levying 500 to 1,000 takas of penalty per animal and thereafter hand over its formal possession to smugglers."

The trade, sources claim, could be generating Rs 14,000 crore to Rs 15,000 crore per annum. The operations involve a strong funnel-shaped network running through Rajasthan, Punjab, HP, Haryana, Uttarakhand and parts of MP. UP forms neck of the funnel and Bihar its stem which finally opens into West Bengal.

Annexure-XVII (GPS coordinates)

Name of the places	GPS locations
Adapur	N26° 55 ' 31.091 ", E 84 ° 56 ' 32.503 "
Aligarh	N 23°14' 11.7594", E 79° 22' 55.9194"
Allahabad	N 23°14' 11.7594", E 79° 22' 55.9194"
Ara	N 25°33' 31.669" , E 84° 40' 1.549"
Azamnagar	N 25°32' 56.572" , E 87° 49 ' 22.956"
Bagha	N26°25' 8.679 ", E 84 °24 ' 59.795"
Bairgania	N26° 44' 24.641 ", E 85° 16' 16.928"
Baliya	N 28°12' 5.83 ", E79 °21' 56.028 "
Ballia	N25° 45' 30.377 ", E84° 8' 55.434 "
Barauni	N25° 28' 9" , E 85° 59'18.999"
Barpeta Road	N 26° 29' 59.9454",E 90° 58' 11.9238"
Basopatti	N 26° 34' 59.999" , E 86° 1 ' 0.001"
Bathnaha	N 26° 38' 20.418", E 85°34'55.934"
Begusarai	N25°24'46.836" , E 86°7'26.677"
Belonia	N23°15'1.769" , E 91°28'3.501"
Benipatti	N26°27'14" , E 85°54'56"
Bettiah	N26°47'59.708" , E84 °30'14.036"
Bhadrapur	N26°32'47.134" , E 88°5'55.46"
Bhaptihahi	N26°18'16.46" , E86°45'4.865"
Bhimnagar	N18°35'47.085" , E75°18'42.118"
Bhutahi	N26°43'27.857" , E 85°33'12.564"
Bhutiachang	N26°47'34.701" , E 91°53'51.767 "
Bilbari	N24°10'3.959" , E 88° 13'5.233"
Birpur	N26° 34'15.455", E 86°2'15.586"
Bishmuri	N25°56'60" , E 88°53'59.999"
Bisramganj	N23°50'37.829" , E 91°19'48.187"
Buxar	N25°33'52.957" , E 83°58'39.893"
Chalama	N32°29'6.854" , E 75°55'15.311"
Chandkhira	N24°35'33.914" , E 92°18'35.418"
Chapra	N25°47'0.773" , E 84°45'11.316"
Charilam	N23°38'14.296" , E 91°18'25.791"
Chauradano	N26°50'50.807" , E 85°0'37.266"
Choraut	N 26°31'53.922", E 85°47'41.468"
Comilla	N 23°27'21.452", E 91°10'55.332"
Dagmara	N26°24'0.971" , E 86°44'47.997"
Daodhara	N22°18'26.314", E 73°10'51.951"
Darbhanga	N26°8'57.044" , E 85°53'26.113"
Dhalcherra	N24°44'56.667", E 92°17'9.495"
Dighalbank	N26°26'38.752", E 87°51'55.475"
Dirang	N27°21'30.392", E 92°14'27.196"
Dubrajpur	N23°48'0" , E 87°22'59.879"
Dulubari	N 25°13'48.989", E 55°10'44.822"
Dumka	N 24°16'0.12" , E 87°15'0"

Fakirganj	N22°21'10.498", E 87°46'48.081"
Forbejganj	N26°18'0" , E 87°15'0"
Galgalia	N26°21'25.775", E 88°8'11.252"
Gandhai	N21°40'0.12" , E 81°6'0"
Gaspara	N26°0'10.489" , E 89°52'34.455"
Gauripur	N26°5'14.132" , E 89°57'43.246"
Gelephu	N26°56'14.295", E 90°29'16.769"
Ghorasahan	N26°54'18" , E 84°54'15.999"
Gokhula	N26°16'18.736", E 85°2'10.813"
Gorakhpur	N26°45'37.996", E 83°22'23.403"
Gournagar	N24°18'20.857", E 92°1'47.164"
Gulabbagh	N25°47'13.727", E 87°32'31.408"
Halali	N16°44' 33.695", E75°20'49.372"
Harlakhi	N26°38'13.789" , E 85°59'2.711"
Hashimara	N26°45'0" , E 89°21'0"
Irani	N24°22'37.696" , E 92°1'29.532"
Islampur	N26°15'39.2" ,E 88°11'16.551"
Jaigaon	N26°5026'49.18",E 89°22'59.291"
Jainagar	N25°3'0" , E 84°4'59.998"
Jardhan	N25°45'8.543" , E 93°25'4.439"
Kadamwa	N26°47'22.664" ,E 85°7'19.211"
Kailashar	N24°19'59.88" , E 92°1'0.12"
Kakarvitta	N26°38'46.982" , E 88°9'21.506"
Kamalpur	N24°11'48.755" , E 91°49'58.989"
Kathalia	N23°22'56.995", E 91°21'6.288"
Katigorah	N24°53'26.929", E 92°35'12.067"
Khadwa	N21°49'32.64" , E76°21'9.255"
Khagaria	N25°30'40.145", E86°28'36.868"
Khowai	N24°4'32.567" , E91°36'19.166"
Kishanganj	N26°18'28.052", E87°46'34.799"
Kulai	N23°28'22.525", E86°51'34.827"
Kumarghat	N24°9'29.88" , E92°1'46.92"
Kumedpur	N25°27'56.868", E88°7'5.361"
Kunauli	N26°26'41.973", E86°46'9.439"
Kusakatta	N20°12'33.563", E84°59'59.835"
Kushinagar	N26°44'21.71", E83°53'24.134"
Kusida	N20°23'30.988", E86°18'58.046"
Ladania	N26°35'56.339", E86°18'53.481"
Lakhipur	N24°48'0" , E93°1'0.12"
Laukahi	N26°35'44.092", E87°3'26.748"
Lohagarha	N26°24'29.409", E87°46'52.508"
Lumla	N27°32'31.078", E91°43'44.936"
Madhubani	N26°20'48.676", E86°4 '17.57"
Madhwapur	N26°36'2.763" , E85°50'36.617"
Mahadeomath	N26°23'0.638" , E86°39'30.922"

Majhari Chowk	N26°18'11.321" , E86°37'33.007"
Malda	N25°0 '39.027" , E88°8'27.948"
Mangaldoi	N 26° 25' 47.9454",E92° 1' 47.9238"
Manihari	N25°21'50.263" , E87°37'57.583"
Manik Bhandar	N24°8'21.256" , E91°48'26.85"
Manshahi	N25°28'30.591" , E87°35'16.131"
Marjadwa	N27°2' 33.511" , E84°36'35.896"
Matiari	N23°27'28.758" , E88°46'50.368"
Melaghar	N23°29'50.113" , E91°19'52.525"
Mohammadabad	N25°37'0.656" , E83°45'11.205"
Mathanguri	N26°46'55.141" , E90°57'27.329"
Motihari	N26°38'60" , E84°55'0.119"
Mughalsarai	N25°16'53.381" , E83°7'11.353"
Muzaffarpur	N 26° 7' 21.3738", E85°22'47.8122"
Narahia	N26°22'18.273" , E86°32'6.063"
Narkatiaganj	N27°6 '28.267" , E84°28'37.523"
Naugachia	N25°23'14.438" , E87°5'52.752"
Naxalbari	N26°40'56.293" , E88°11'59.464"
Nayagram	N24°47' 3.444" , E92°17'55.5"
Nganglam	N26°50'23.635" , E91°14'57.831"
Nilambazar	N24°44'36.208" , E92°21'48.308"
Panagarh	N23°26'43.099" , E87°28'13.09"
Panbang	N26°51'37.271" , E91°5'23.103"
Paneri	N26°43'41.948" , E91°54'53.837"
Panisagar	N24°15'13.157" , E92°8'59.768"
Panitanki	N26°38'23.762" , E88°10'11.982"
Panjipara	N26°8'35.306" , E88°1'26.686"
Patamari	N25°57'20.141", E89°51'10.229"
Patharkandi	N24°36'26.924", E92°19'2.036"
Pathsala	N26°30'42.783", E91°10'51.25"
Patna	N 25°36'44.945", E85°7'41.9226"
Pawa khali	N26°19'51.46" , E87°56'44.643"
Pecharthal	N24°11'23.528", E92°5'57.422"
Phuentsholling	N26°51'32.123", E89°23'25.724"
Phulparas	N26°20'55" , E86°29'47"
Pipra kothi	N26°32'42.894", E84°56'33.84"
Pratapganj	N26°17'50.406", E86°57'14.958"
Punia	N26°22'28.588", E91°52'59.032"
Radhanagar	N22°43'34.933", E87°51'57.684"
Rajabala	N25°51'23.805", E90°0'12.589"
Rajnagar	N24°16'28.536", E88°38'18.987"
Rampurhat	N24°10'33.56" , E87°47'9.045"
Rangiya	N26°26'23.43" , E91°36'46.616"
Raxaul	N26°58'59.88" , E84°51'0"
Runikhata	N26°38'3.082" , E90°22'54.833"

Sakri	N26°13'6.715" , E86°4'42.405"
Salapara Pt 2	N25°49'15.651", E89°49'24.875"
Salapara Pt. 3	N25°48'49.075", E89°50'2.811"
Salapara Pt1	N25°50'14.278", E89°50'19.669"
Samdrup Jongkhar	N26°55'43.306", E91°38'13.973"
Samthaibari	N26°36'50.642", E90°55'3.327"
Sidhaw	N27°5'24.974" , E81°54'25.547"
Sikta	N27°2'49.914" , E84°23'18.138"
Sikti	N26°22'14.786", E87°31'20.326"
Siliguri	N 26° 42' 28.015",E88°25'38.859"
Singhimari	N26°27'31.119" , E87°48'12.175"
Sitamarhi	N26° 35' 53.052",E85° 29' 43.162"
Sonamura	N23° 28' 18.84" , E91° 15' 59.039"
South Salmara	N25° 53' 22.169", E90° 1' 3.574"
Sugauli	N26° 45' 27.618", E84° 43' 15.986"
Sursand	N26° 38' 22.74" , E85° 43' 17.896"
Tangla	N26° 39' 26.181", E91° 54' 44.519"
Tapu	N26° 23' 17.617", E87° 55' 38.467"
Tawang	N27° 34' 42.118", E91° 52' 34.827"
Teliamura	N23° 50' 23.38" , E91° 38' 6.719"
Terhagachh	N26° 22' 51.301", E87° 41' 22.363"
Thakurganj	N26° 25' 35.861", E88° 7' 50.822"
Tilgaon	N25° 38' 53.475", E88° 16' 9.24"
Ultapani	N26° 46' 33.033", E90° 18' 6.941"
Umgaon	N26° 36' 46.954", E85° 57' 49.182"
Unnao	N26° 32' 52.984", E80° 29' 4.581"

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