

“Integrated characterization of three cross-border areas of India for the risk assessment and targeted, coordinated Interventions of HPAI: a Socio-economic perspective”

Final report

FARMER

(Fellowship for Agri-Resource Management and Entrepreneurship Research)

#19, Flyover Rajgharh Link, Chandmari, Guwahati, Assam, India, E-mail:farmerneindia@gmail.com



Date: 15th August 2010

Table of Contents

Table of Contents.....	1
List of tables.....	2
List of figures.....	2
Abbreviations and acronyms	2
Executive summary	3
Introduction.....	4
Objectives of the study:	4
Areas covered under the study:	4
Scope of the study	6
Brief description of the methods applied and the main activities conducted:	6
Indicator 1 & 2	9
Indicator 3.....	10
Indicator 4.....	12
Indicator 5.....	13
Indicator 6.....	18
Indicator 7.....	20
Indicator 8.....	21
Indicator 9.....	22
Indicator 10.....	22
Indicator 11.....	22
Indicator 12.....	23
Findings of the stakeholder Analysis and review of preparedness:	24
Perception of risk of HPAI in the area under study:.....	25
Conclusions and recommendations	27
Constraints and challenges.....	30
Annex I: Details of local field team.....	31
Annex II: Details of the key persons interacted with:.....	32
Annex III: Notes on each of the stakeholder consultations:	37
Sonamura, Tripura, India, 31 July 2010	37
Jaigaon, West Bengal, India, 4th August, 2010.....	38
Moreh, Manipur, India, 10th August, 2010.....	40
Central Stakeholder consultation: Guwahati, Assam, India. 13th August, 2010.....	43

LIST OF TABLES

1. NUMBER OF INTERVIEWS OF KEY INFORMANTS CONDUCTED AT DIFFERENT PLACES.
2. DESCRIPTION OF STAKEHOLDERS’ MEETING CONDUCTED IN VARIOUS PLACES.
3. HISTORY OF PRESENCE OF H5N1 IN THE CORRESPONDING STATES OF THE STUDY AREA.
4. COMPARISON OF COMPENSATION STRUCTURE WITH PREVAILING MARKET RATE.
5. SUMMARY FINDING OF HIGH RISK SPECIES SPOTS AND PRACTICES.
6. CROSS BORDER MOVEMENTS OF POULTRY AND POULTRY PRODUCTS.

LIST OF FIGURES

1. MAP SHOWING STUDY AREAS.
2. STUDY ACTIVITY TRIANGLE.
3. LOCATION OF HPAI OUTBREAK DURING 2008 – 2009. INDIA.
4. MOVEMENTS OF POULTRY INPUT FROM THE POINT OF ORIGIN TO DESTINATION (SONAMURA).
5. MOVEMENTS OF POULTRY AND POULTRY PRODUCTS WITHIN TRIPURA AND SONAMURA.
6. MOVEMENTS OF POULTRY AND POULTRY PRODUCTS IN JAIGAON.
7. MOVEMENTS OF POULTRY AND POULTRY PRODUCTS IN MOREH.

ABBREVIATIONS AND ACRONYMS

HPAI	HIGHLY PATHOGENIC AVIAN INFLUENZA
GP	GRAM PANCHAYAT
BHE	BROILER HATCHING EGG
DOC	DAY OLD CHICK

1USD = INR 45

Executive summary

The trans-boundary aspect of the spread of HPAI remains one of the major challenges in the fight against HPAI in Asia and Pacific. Understanding the epidemiological and socio-economic factors that determine the circulation of HPAI virus in the poultry populations in any cross-border area is essential for effective control. In this context, the study attempts at bridging the existing gaps in information required for HPAI risk assessment of three cross-border areas in India. These border areas, viz., Sonamura (Bordering Bangladesh), Jaigaon (Bordering Bhutan) and Moreh (Bordering Myanmar) belong to the Indian States of Tripura, West Bengal and Manipur, respectively. The scope of the study which was completed in approximately two months is limited to 12 pre-identified indicators.

The study described the selected cross-border areas and reviewed secondary data pertaining to the first two indicators, viz., current presence and history of HPAI outbreaks. To bridge the information pertaining to the remaining 10 indicators, it focused on one-to-one structured interviews with a convenient but representative sample of 392 key informants including farmers, traders, retailers, etc. The findings in each of the cross-border areas (mostly on the Indian side of the border) are enriched and validated through a number of stakeholder consultations.

The major findings indicated a high degree of vulnerability of each of the areas to HPAI. There is a history of HPAI outbreak in all the three Indian States since 2007. The State of West Bengal with the most recent (February 2010) and highest number of outbreaks (59 in 2008) is the point of origin for most of the poultry farm inputs such as feed, broiler hatching egg, day-old chick, etc. These inputs find vibrant markets in the other two States including the border towns where there are production clusters. There are variable degrees of legal (only in case of Indo-Bhutan border) as well as illegal cross border trade of poultry and poultry products that are thriving because of increasing demand and other incentives. The level of knowledge of farmers who are mostly small holders (commercial/backyard) in all the cases is inadequate. There are inadequate incentives, policy support for proper surveillance, reporting, and containment operations. Infrastructure, human resources, communication, cooperation, enforcement and service delivery, bio-security, education, etc., are all grossly inadequate. High risk husbandry practices have been prevailing for the longest time due to economic and social reasons. The stakeholder analysis at the backdrop of all these findings indicated varied interests and inadequate preparedness.

The study recommends a series of measures which are primarily linked to governance, awareness, infrastructure, and capacity development. The focus suggested is inclusive, aimed at transparent trade and the creation of an incentive-based system.

Introduction

The Emergency Centre for Transboundary Animal Diseases for Asia and the Pacific (ECTAD-RAP) of the Food and Agriculture Organization (FAO) of the United Nations has taken up activities for an improved analysis of disease risk to animals and humans. The activity is funded under Phase-II of the Asian Development Bank funded project “Strengthening Regional Capacity to Control and Prevent Avian Influenza in Asia and the Pacific”.

An initial inception meeting with the theme “Regional Risk Assessment of HPAI in South and Southeast Asia: A Socio-economic Perspective” was held on 28-29 April 2010 in Bangkok, Thailand. The meeting identified cross-border areas to conduct the risk assessment of the spread of HPAI and the partners with whom the assessment will be done.

FARMER (Fellowship for Agri-Resource Management and Entrepreneurship Research), one of the participants of the above-mentioned inception meeting, was given responsibility to conduct the assessment in three international borders of India, viz., India-Bangladesh border at Sonamura, India-Bhutan border at Jaigaon, and India-Myanmar border at Moreh.

It was also decided in the inception meeting that the risk assessment will be carried out for 12 identified risk indicators. Subsequent to the meeting, FARMER signed a letter of agreement to conduct a short primary research. The research focussed on gathering information on 10 of the 12 risk indicators from each of the border areas. It was assumed that the information pertaining to other two indicators can be sourced from previous records.

Objectives of the study:

- a) To define the areas and map key resource points for continuous information sourcing;
- b) To bridge existing gaps in information required for risk assessment in relation to pre-identified indicators; and
- c) To conduct a stakeholder analysis, and review the preparedness for an HPAI outbreak.

Areas covered under the study:

The study covered the following cross-border areas of India:

Area 1: ‘Sonamura’ (bordering Bangladesh): The area is a subdivision of West Tripura District, Indian State of Tripura and comprises of three development blocks namely

Kathalia block, Melagarh block, and Buxanagar block. The total population of Sonamura town is 10,074 as per 2001 census

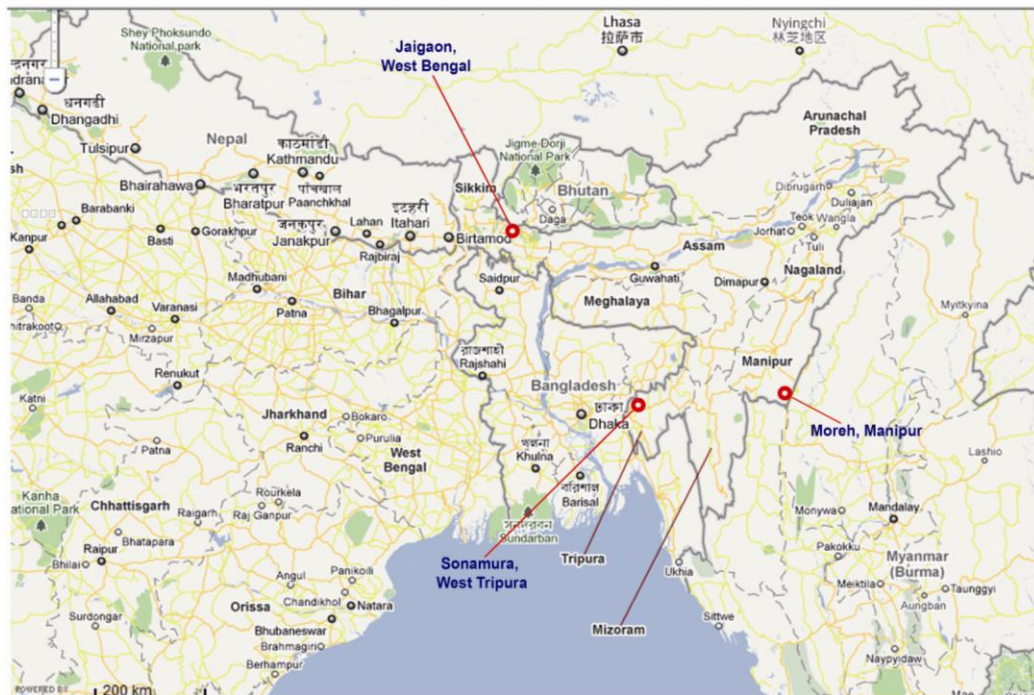


Figure 1. Map showing study areas.

Area 2: ‘Moreh’ (bordering Myanmar): The area is a border town under the Chandel District of the Indian State of Manipur, sharing borders with Myanmar at Namphalong. The ‘Indo-Myanmar Friendship Bridge’ in Moreh connects India to ‘Kalewa’ in Myanmar’s Chin State. The town is divided into nine wards. The population of the town is composed of various tribes like Kuki, Meiteis, Meiteis Pangal, Tamil and Nepalese. The approximate population of the main town area is about 18,000. Three rivers—Khujeirol, Leirok and Lokchou—pass by the town across the border area. The major livelihood source of the people of the town area is petty trading and transport.

Area 3: ‘Jaigaon’ (bordering Bhutan): The area is a small locality under Alipurduar subdivision of Jalpaiguri District of the Indian State of West Bengal. The area is at the gateway to Bhutan—‘Phuentsholing’. Jaigaon has three Gram Panchayats¹ (GP): Gram Panchayat I, GP II, and Dalsingpara. Jaigaon town is situated at GP II. River Toorsa, Barsha and Singey pass by Jaigaon. The total population of 1, 58,664 (2007 census) is composed of Nepalese (60%), Bengalis (20%), Biharis(10%) and others (10%). The main livelihood of the people in the area is agriculture, wage labor, petty trading, and transport.

¹ Village administrative unit.

Scope of the study

The study is based on the following twelve (12) pre-defined risk indicators.

1. Current presence of outbreaks of HPAI in one side of the border.
2. History of the presence of the disease in the area.
3. Surveillance activities in the area and effectiveness of control measures where applicable.
4. Presence of high-risk species, high-risk spots, or high-risk husbandry practices.
5. Movement of live poultry or poultry products within the area, across the border/s, and to other destinations.
6. Production clusters of poultry or poultry products.
7. Movement corridors, and current or past presence of HPAI in the areas of origin of poultry and poultry products in the corridor.
8. Local and/or regional live bird markets (LBM) and/or poultry product markets.
9. Hubs of poultry and poultry products.
10. Highly-populated areas.
11. Regulatory framework, enforcement, and controls at border points and markets.
12. Permanent or temporal driving forces for cross-border trade.

Brief description of the methods applied and the main activities conducted:

The study activities are sub-divided into: Desktop research, Field Data collection and Expert consultations, placed on the three sides of a triangle feeding and getting fed by each other (Figure 2).

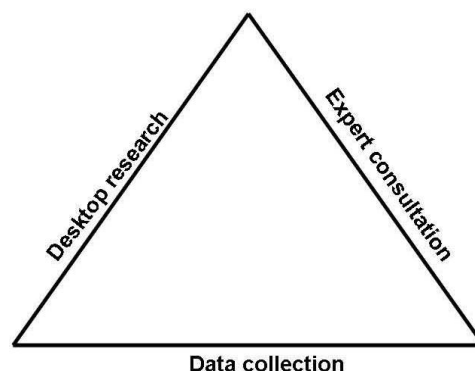


Figure 2. Study Activity Triangle

The Core Team and Research Support Group: FARMER assigned a core group for the study under the overall leadership of its Chief Technical Advisor. The core group is composed of a principal field researcher, an associate researcher, one administrative support staff, and one statistical analyst. A four-member ‘Research Support Group’

comprised of experts (Honorary Fellows of FARMER) from the academe and different government departments were also constituted to guide the core team.

Local Field Team: For each of the areas under study, a local team was constituted. The selection of each local team was based on initial recommendations of FARMER fellows in the concerned States. Personal interviews and orientations were conducted at the different study areas under the supervision of the principal field researcher with due diligence. Details of field teams with their corresponding qualifications are shown in Annex I.

Procedure adopted for data collection:

Members of the core team visited each of the study areas and interacted one-to-one with key persons associated with the government and the private sector, seeking their help and suggestions in conducting the study. A list of key persons interviewed prior to/alongside the interview of sample key informants is included in Annex II. These interviews helped in the collection of relevant secondary information and in the preparation of route maps of the areas. These informal interactions also helped in understanding the situation on the ground, and to draw the work plan, and communication strategy for the formal data collection. A series of discussions were conducted involving the local team to agree on the communication strategy and the work plan. Where required, certain questions in the research guide developed earlier were translated into the local language to facilitate comprehension. The core team provided hand-holding support to local teams initially to collect the data as per guide and the mutually agreed work-plan.

A minimum of two enumerators were engaged to conduct interviews of any key informant. They were then instructed to fill up the questionnaire in a neutral place after consultation. This procedure was implemented to mitigate, if not eliminate bias.

During their stay in the respective locations, the core team made an initial analysis of findings which were documented as ‘trip report’ for onward sharing with members of the research support group for the latter’s comments and suggestions.

Sampling:

The sample size of key informants for each location was determined based on the judgement of the both core and field teams. The sampling procedure used was the convenience sampling. However, all attempts were made to make the number of the samples representative (including players across the value chain), i.e., farmers, traders, and retailers. Care was taken to include various value chain players from villages within the selected border areas. Location-wise details of the field data collected are shown in Table 1 below:

Table 1: Number of interviews of key informants conducted at different places.

Name of the area	Farmers		Traders	Retailers	Other ²	Total
	<i>Backyard</i>	<i>Commercial broiler</i>				
Sonamura	58	72	10	25	15	180
Jaigaon	62	18	8	12	12	112
Moreh	66	8	4	12	10	100
Total	186	98	22	49	37	392

Electronic documentation:

The core team undertook all efforts to document risky husbandry practices and other relevant issues using digital cameras.

Stakeholder consultation and Validation:

A total of four stakeholder consultations were organized (one in each of the three study areas, and one central consultation at Guwahati) to discuss the findings and to seek opinion of stakeholders. These consultations (See Table 2 for the venues, dates, and details of the participants) helped in validating the collected information and to assess the preparedness of various stakeholders.

Table 2. Description of stakeholder meeting conducted in three study locations.

Location and date	Farmers	Traders	<i>Panchayat</i> Representatives	NGO representatives	Other	Total
Sonamura (31-8-2010)	15	4	6	3	7	35
Jaigaon (4-8-2010)	8	14	0	1	5	28
Moreh (11-8-2010)	14	2	0	4	5	25
Total	37	20	6	8	17	88

² Village head man, consumers, representative of Panchayati Raj Institutions, NGOs etc

Main findings:

Indicator 1 & 2

There is past history of HPAI outbreak in the States corresponding to the selected border areas as shown in table-3. The locations of HPAI outbreaks during 2008-2009 in India in general are shown in Figure 2.

Table 3. History of presence of H5N1 outbreaks in the corresponding states of the study area.³

Study Area	State	Year	Virus Clade	Location	Number of outbreaks
Sonamura	Tripura	2008 (April)	EMA3 sublineage of clade 2.2	West Tripura District (Bishalgarh and Mohanpur) Dhalai District (Salema block)	3
Jaigaon	West Bengal	2008	EMA3 sub lineage of clade 2.2	Spread across the state	17
		2009		Darjeeling, Coochbehar, Dakshin and Uttar Dinajpur district	8
		2010 (Jan)		Murshidabad district (Khargram block)	4
Moreh	Manipur	2007 (July)	2.2 (Distinct from EMA sublineages)	Chingmeirong village in East Imphal district	1

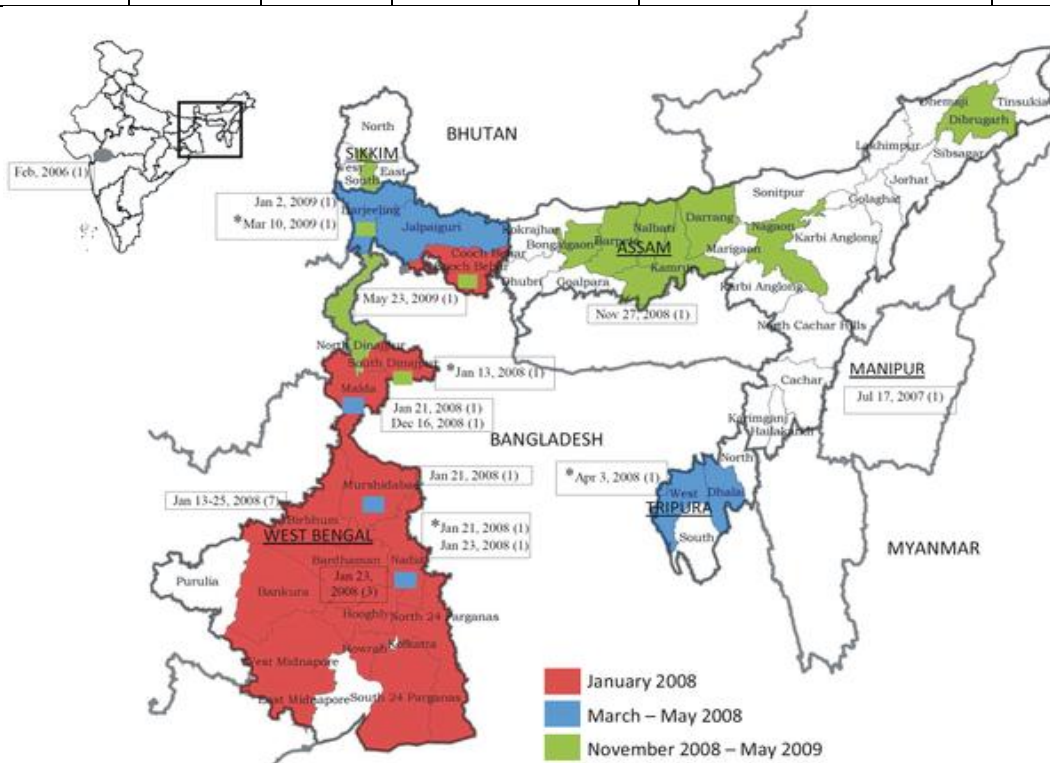


Figure 3. Location of HPAI outbreaks during 2008-2009, India.

Source: Chakrabarti Alok (2009) National Institute of Virology, Pune, India

³ OIE website.

Indicator 3

3.1 Level of knowledge of HPAI:

Knowledge levels of farmers on HPAI are largely inadequate. Commercial broiler chicken farmers are aware about the disease but are skeptical about the pathogenicity of the diseases. Normally, information on husbandry practices and management of diseases pass from input (chick, feed, and medicine) dealers down to farmers. Commercial broiler chicken farmers are more concerned about the “loss” in the event of outbreak than the health hazards caused by the disease. There are reports of smuggling of poultry from infected zones to non-infected zones in a spree to sell during outbreak of HPAI in Sonamura.

Backyard farmers, already immune to high mortality of their backyard poultry, perceive HPAI H5N1 as just “another disease”. There are many instances of abnormal mortality of backyard chicken in Sonamura, Jaigaon, and Moreh, especially during the months of June to August, and again during the months of November to January that went unreported and undiagnosed.

Sonamura: Many traders perceive the notifications issued on HPAI as “political conspiracy” while others believe that it is the “conspiracy by government departments” to earn “extra money” by the Veterinary Department. According to a few informants, the last outbreak of bird flu was a “golden opportunity” for the poor people to have chicken meat at cheap price.

Jaigaon: Traders feel that there is “conspiracy” in favor of big business houses to do business in Bhutan.

Moreh: The Director of Veterinary and Animal Husbandry of the Government of Manipur has been subjected to death threats since the year 2007 for the detection of HPAI in Manipur. Backyard farmers feel that the diseases have been introduced to the state through supply of chicks and other inputs from outside the state.

3.2 Level of reporting of suspected cases by farmers

As per information given by the government, there is currently both active and passive surveillance in all the three States (representing the three areas of the study). While there is under-reporting in cases of passive surveillance, there is poor collection of samples, when it comes to active surveillance. A few farmers in the subject areas have reported that they observed sample collections conducted (active surveillance) only during the last outbreak of HPAI.

Sonamura: No farmers could remember recent collection of samples from their poultry although veterinary departments claim that there is active surveillance. Generally, high mortality in backyard farming goes unreported. Commercial broiler farmers report to their input suppliers or private veterinarians regarding any abnormal mortality in their farm.

Jaigaon: There is report of collection of samples within the area with no report of collection of samples from backyard poultry near the villages bordering Bhutan.

Moreh: There is no report of active surveillance. Abnormal mortality in backyard poultry remains largely unreported.

3.3 Level of provision of veterinary Services

Accessibility of veterinary service by backyard farmers in all the three areas is largely inadequate. No vaccination is done for backyard poultry. Commercial broiler chickens are vaccinated routinely against Ranikhet and Gumboro diseases mostly by the farmers themselves.

Sonamura: There is a well-structured Animal Resource Development Department in the state of Tripura. There are five veterinary dispensaries at Sonamura subdivision. However, backyard farmers of Sonamura rely on homeopathic medicine to treat their poultry, whereas commercial broiler farmers mostly depend on advice given by experienced farmer/traders.

Jaigaon: There is one trained barefoot veterinary health worker⁴ in Jaigaon. Each of the three Panchayat departments of Jaigaon has one veterinary office managed by a veterinary field assistant.⁵ The office of the block veterinary office is at about 25 KM away from Jaigaon.

Moreh: There is no Veterinary Dispensary at the Moreh border. It was demolished three years ago during a communal riot.

3.4 Level of compensation:

The structure of compensation for affected farmers is as per the rules of the Government of India. Table 4 below shows the compensation structure of various poultry and poultry products and comparative market rates in the study areas:

Table 4: Comparison of compensation structure with prevailing market rate⁶

<i>Species of bird / input</i>	<i>Compensation rate (USD)</i>	<i>Prevailing market rate (USD)</i>		
		<i>Sonamura</i>	<i>Jaigaon</i>	<i>Moreh</i>
Adult backyard	1.1	2.62	2.62	4.4
Backyard chick	0.44	0.89	0.89	1.33
Adult commercial	0.89	2.4	2.4	4.27
Commercial chicks	0.44	0.71	0.71	1
Adult ducks/geese	1.67	3.3-4	4.44-5.55	5.56-6.67
Ducklings	0.78	1.1	1.44-1.67	1.44-1.56
Eggs	0.04	0.11	0.11	0.16
Feeds (Kg)	0.13	0.53	0.53	0.66

There is no separate rate for broiler hatching eggs (BHE) whereas the rate of broiler hatching eggs is about INR 22-25 (USD 0.56) at present market.

⁴ Community animal health worker (*Praani bandhu*).

⁵ Assistant to a veterinarian trained in veterinary first aid.

⁶ Compensation GOI Action plan 2008, Market rate assumption as prevailing during the time of study, Assumption of weight of Backyard bird (Avg.) 1 Kg and Commercial Broiler chicken 1.2 Kg.

3.5 Bio-security plans in different areas:

Cleaning and disinfection is carried out by the commercial broiler chicken farmers. This is a common practice in all the three areas under study. Generally, disinfection of sheds is done by spreading lime powder or by lime white wash. No specific measures to restrict movement of human or bird of other species (domesticated or wild) in the farm is in practice.

The practice of disposal of dead birds (death due to any reason) in all the three areas under study is by throwing it in nearby water bodies, road sides, dustbins, or jungle. Burying of dead bird is also in practice. No disinfectant is used in such cases. There is practice of consumption of dead bird in Jaigaon.

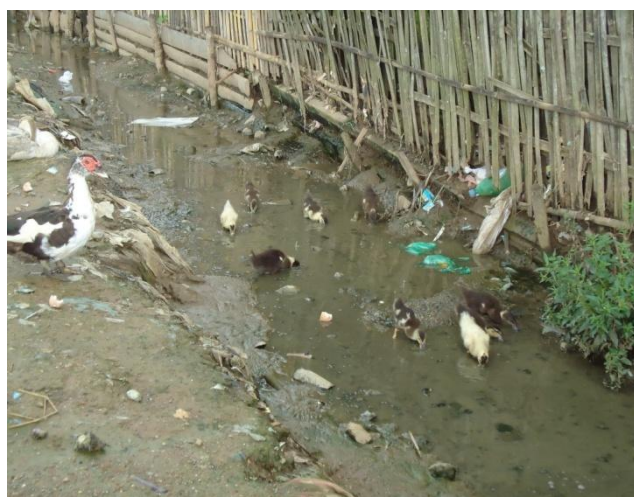
Backyard farmers of all the three areas do not adopt any kind of bio-security measures (disinfection or restriction of movement).

Indicator 4

A number of high-risk husbandry practices are present in the area under study. Table 5 below summarizes the findings under this indicator:

Table 5. Summary Findings of high-risk species, spots and practices.

Practices	Sonamura	Jaigaon	Moreh
Free range ducks linked with paddy fields	Highly prevalent	Highly prevalent	Highly prevalent
Presence of wet rice crop and season	Present: June, July	Present: June, July	Present: June, July
Scavenging birds	Native chicken and ducks together	Native chicken and ducks together	Native chicken and ducks together
Exotic breed of susceptible species	Present	Present	Present
Presence of cock fighting	Present	Present	Present
Presence of wet lands, ponds with permanent presence of wild birds or migratory birds	One big lake: Rudrasagar lake), numerous water bodies, one river (Gumati)	Three rivers	Rivers and small water bodies
Movement of catching crews	Not present	Not present	Present
Two different age group of Commercial Poultry under same shed	Practiced frequently	Not practiced	Practiced occasionally
Disposal of dead birds	Thrown away or buried	Human consumption, thrown on roadside or river, some people bury	Thrown in the river at the border
Disposal of poultry litter	Used in agriculture land	Thrown away on the road	Used in agriculture or thrown away in the river
Mixing of birds of different species	All backyard species, backyard with commercial broiler	All backyard species, backyard with commercial broiler	All backyard species, backyard with commercial broiler



Backyard ducks at Moreh.



Duck- chicken scavenging at Sonamura.

Indicator 5

There are relatively wide geographical movements of poultry and poultry products in the areas under the study with limited number of points of origin for BHE, DOC, and broiler chicken feed. However, movements of live poultry are mostly limited to the respective states. The cross-border movements of products in the three different areas under the study are summarized in the table below:

Table 6: Cross border movements of poultry and poultry products

Area name	Outgoing Products/volume	Incoming product/ Volume	To/from which country
Sonamura West Tripura	DOC: 10000 per day	DOC: not estimated Ducks: 500 number per week Duck eggs: not estimated	Bangladesh
Jaigaon Jalpaiguri, West Bengal	Live ducks : approx 2000 number in a season (winter) Dressed chicken: Approx. 10,000 kg per day DOC: not estimated	Broiler feed: not estimated	Bhutan
Moreh, Manipur	Nil	Eggs of native chicken: Not estimated Live native chicken: 50- 60 Kg per day	Myanmar

The point of origin of BHE is Bangalore, Hyderabad, and Kolkata for all the three areas. The point of origin of DOC is limited to the respective states or neighbouring states. The point of origin of feed is mostly Bihar and Siliguri (West Bengal). The area specific movement of poultry and poultry products are shown in the flow diagrams below for each area separately.

5.1 Sonamura: Poultry inputs

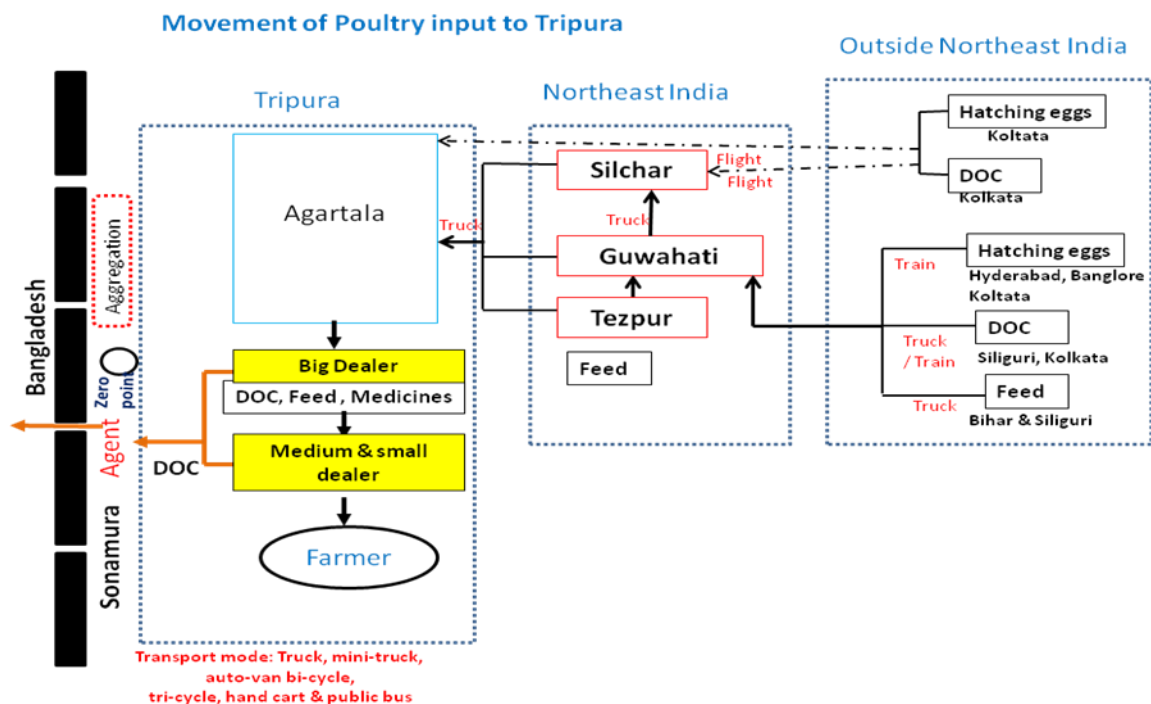


Figure 4: Movements of poultry inputs from point of origin to destination (Sonamura).

Inter-state movement of inputs for Tripura within the Northeast is limited to Guwahati and Silchar City only (both belonging to the State of Assam). Poultry feed also comes to Agartala from Tezpur of Sonitpur District in Assam.

As per estimate of July 2010, approximately 10,000 DOCs per day are transported from India to Bangladesh through the porous border with help of local residents at zero point of Indo-Bangladesh borders. Interestingly, there is also reverse trade of DOC from the Bangladesh side particularly during the month of November.

Mini trucks/vans are used to transport DOCs from Agartala to Sonamura. Transport cost is INR 1/- per DOC. The DOCs are provided with rest and hydration at aggregation point, at the zero point of the Indo-Bangladesh border point. Common modes of transport of DOC from zero point are hand carts, three-wheeled cycles, rickshaws, carrying on the head, and mini truck or auto-van (rarely). Cost of transport from zero point to different destinations within Bangladesh varies from INR 0.60 to INR 1/- per DOC.

Poultry and poultry products

Maximum movement happens for commercial broiler chicken within the state and Sonamura through the network of traders in different places.

There are limited movements of native poultry and poultry products. Table eggs mainly originate outside Northeast India and their movements are largely limited to towns and suburban areas. Poultry and poultry product traders at different points along the movement corridor help each other with poultry inputs (DOC, feed, etc.) and ready live birds as per the local supply and demand scenario.

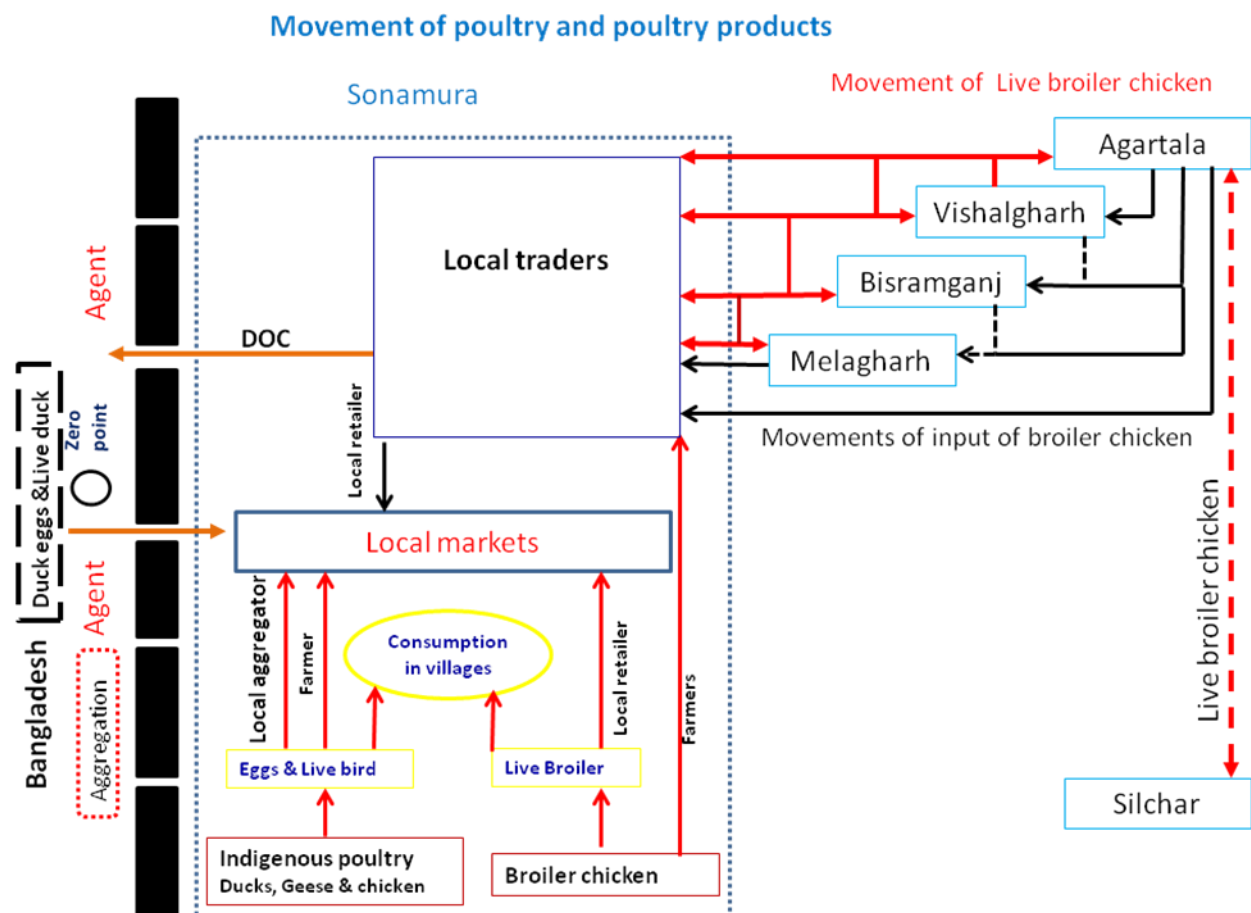


Figure 5. Movements of poultry and poultry products within Tripura and Sonamura.

Although there is no record of legal trade, ducks and duck eggs are exported from the local market of Sonamura especially during winter season. The nature of cross-border trade is unorganized and in small quantities, largely dependent on seasonality and on demand and supply, and is triggered by festivals on both sides of the border.

Transport cost for 2,000 DOCs from Agartala to Sonamura is INR 800 (17.8 USD), whereas transport cost of feed from Agartala is Rs.10/- (USD 0.22) per bag of 70 kg. Cross-border transport of DOCs is done by minitrucks whereas transport of live bird is mostly done by humans as well as hand carts.

5.2 Jaigaon:

Bhutan is largely dependent on Jaigaon to meet the demand of chicken meat. There is legal trade of frozen chicken from India to Bhutan, which passes through a quarantine station at the border crossing point at Pheuntsholing.

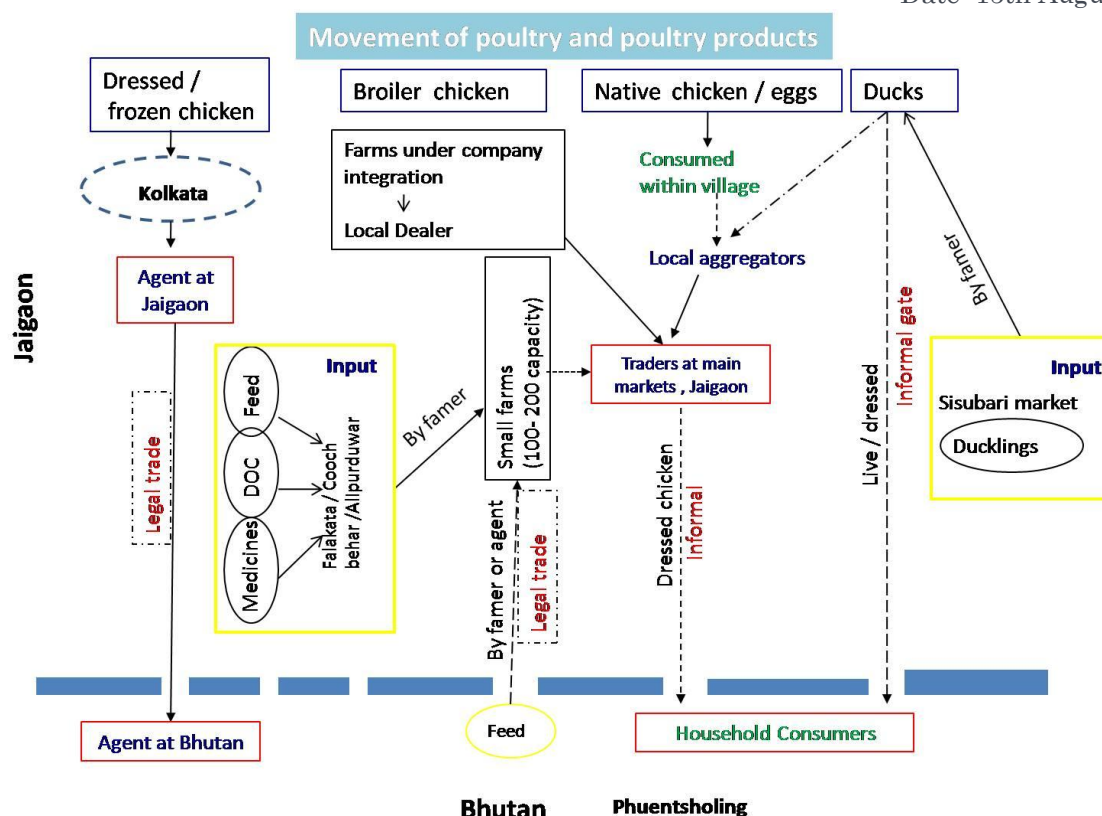


Figure 6. Movements of poultry and poultry products in Jaigaon.

Consumers from Bhutan come to the villages of Jaigaon bordering Bhutan to purchase live ducks, especially during winter season (October to November) every year. The few small scale (100 to 200 capacity) farms in Jaigaon supply to meet the village level demand. It can be assumed that villages rearing broiler chicken near the porous border points also supply directly to consumers at Bhutan in a very small scale.

Sector 2 farms (integration broiler farms under company) located at Falakata, Birpara, and New Alipurduar of West Bengal (approximately 40 to 60 km away from Jaigaon) supplies live broiler chicken to the two main markets of Jaigaon. Dealers at the point of origin of the live broiler chicken keep Rs.1/- (USD 0.02) as commission per kilogram of broiler chicken traded. Transportation charge is Rs.1.50/kg (USD 0.03) and traders at Jaigaon earn Rs. 3/- (USD 0.07) per kg. The price structure of the entire trade of live broiler chicken is transparent throughout the entire value chain.

The government of West Bengal introduced RIR breed of chicken amongst the farmers to be reared in backyards for both meat and egg purposes. Under the arrangement, one Self-Help Group at Tooribari village in the Jaigaon area is given DOC for breeding. After completion of breeding the grown up chicks are distributed in numbers of 10 to 20 to each member of the other Self Help Groups to be reared in the backyard system. Feeds and medicines are supplied free of charge amongst the beneficiaries.

There is limited movement of eggs and native⁷ chicken. Table chicken eggs come mostly from Andhra Pradesh of Southern India to meet the demand of the urban population.

5.3 Moreh:

There are movements of broilers from Imphal (Capital city of Manipur) to Moreh via Kakching. There are also movements of live chicken from Moreh border to Myanmar in small quantities through small traders.

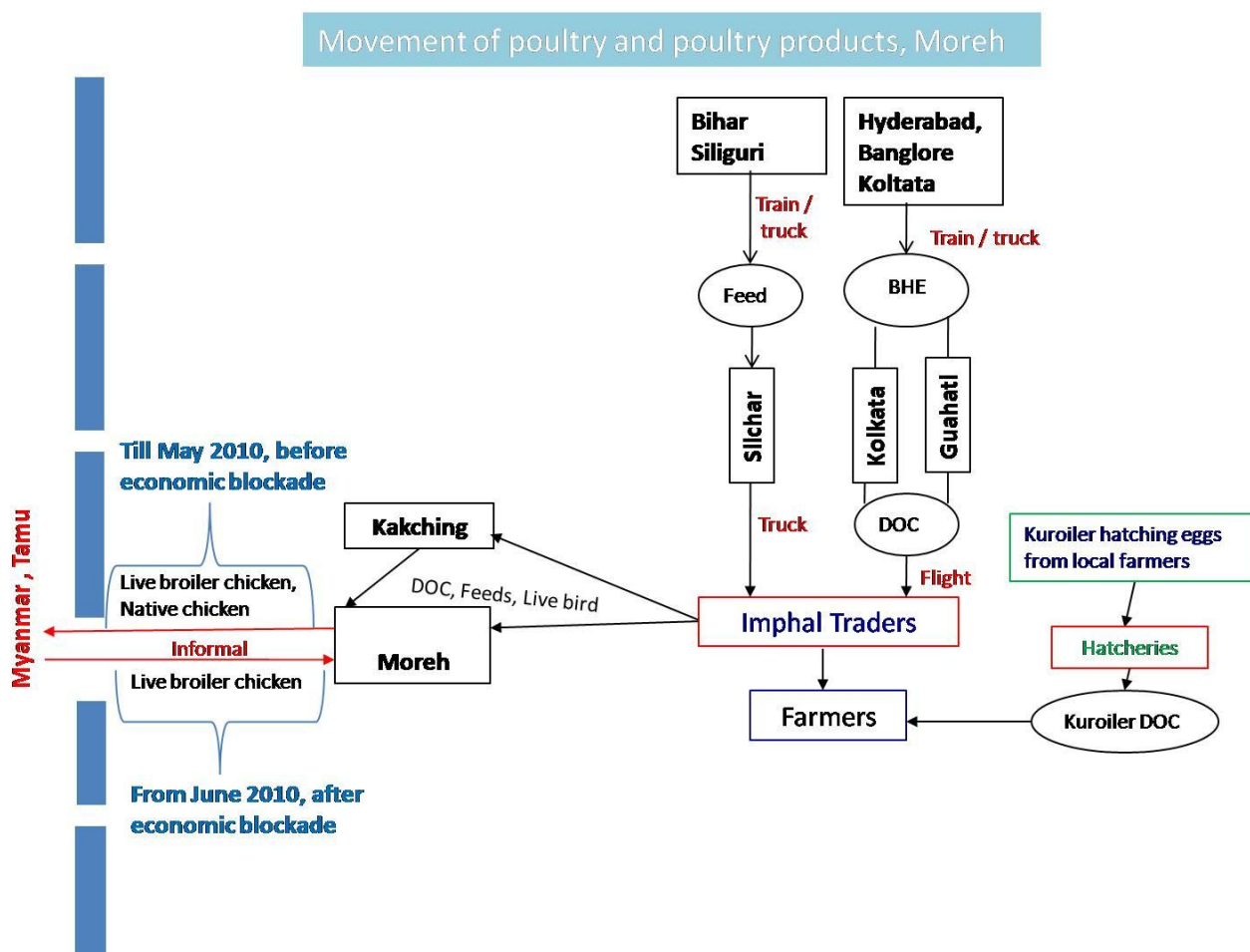


Figure 7. Movement of poultry and poultry products at Moreh.

At present small traders from Myanmar at Moreh border or residents of Myanmar bring live broilers, native chicken from Tamu of Myanmar through the porous border via bicycle, tricycle, or small auto carriers. There are 5 to 8 traders in the Moreh border importing about 20-30 number of chicken every day.

Few farmers at Moreh border rear broilers. The farm sizes are small averaging around 50 to 70 per batch.

⁷ Chicken of indigenous variety.

Few hatcheries collect Kuroiler (colored bird) hatching eggs from Kuroiler bird farmers. The DOC produced after hatching at the hatcheries is then supplied to farmers.

Cost of transport of DOCs entering Imphal from Guwahati via air is Rs.5/- (USD 0.11) per chick. For DOC coming from Kolkatta, the transport cost can be calculated at Rs. 8/-(0.18 USD) per chick. Cost of transport of feed is very high at Rs.500/-(USD 11.11) per 70 kg bag from Silchar of Assam. Transportation of feed from Silchar to Imphal sometimes takes about 17 days.

The high demand of chicken meat for military personnel posted at Manipur is met by transporting live broiler from Khatkati of Assam-Dimapur (Nagaland State of India) border.

Indicator 6

Poultry production systems:

There are two distinct major production systems of poultry in the areas under study

1. Intensive production system: Commercial broiler chicken and Kuroiler.
2. Free range or scavenging system.

Intensive production system:

Intensive production system has been defined as a high input-high output system. Day-old chicks (DOC) are obtained from hatcheries. Commercial feed of high nutrition value is fed to achieve desired body weight at the age ranging from 35- 45 days (1.2 kg – 1.8 Kg). Rearing is done under strict confinement with routine medications and vaccinations. The capacity of the majority of farms in the areas under study ranges from 50 – 200. However, there are about 70 to 80 farms with capacities ranging between 500 to 1000 in Sonamura.

The capacity of most number of farms at Jaigaon is between 100 to 200. There are also farms with capacities of 20 to 50 in the area. In the Moreh border, the normal trend of capacity of broiler chicken farm ranges from 50 to 70. Generally, broiler chickens are not allowed to mix with other species of birds. Some amount of bio-security measures are being implemented in all places.

There is also a practice of keeping of birds of two different age groups under the same shed in all the three places, especially during the period of high demand and low supply. Farmers with capacity up to 500 or below generally resort to keeping birds of two age groups under the same shed.

Farming system at the sourcing point of live broiler chicken for Jaigaon area is more bio-secure and is managed by companies.

Kuroiler (colored birds) farming is comparatively more prominent in the Jaigaon and Manipur. Grown up chicks (after a brooding period of about 20 days or above) are purchased by backyard farmers and reared as backyard poultry in Jaigaon area. A small number (10 to 20) birds are sold in the market after being reared for 3 to 6 months as “native” birds. No special healthcare is provided for these birds.

Production clusters:

Sonamura: Kathalia block, Sonamura, Melagharh block, N.C. Nagar, Bishalghar, and Biramganj are the production clusters for live broiler chicken. The source point for DOCs is Agartala.

Jaigaon: Falakata, Birpara, and Alipurduwar are the source points for live broiler chicken.

Moreh: There is no production cluster currently in the area that can contribute to cross border trade

Free range or scavenging:

Almost every household in the villages under study areas keep backyard poultry in their houses. Native poultry, ducks of different species, and geese are reared in the scavenging system. Muscovy ducks could be seen in Moreh area. Improved varieties of chicken like Giriraja and Banaraja could be seen in the Jaigaon and the Moreh areas. The Chitagong variety of local chicken of Bangladesh could be seen in Sonamura.

There is a high density of native poultry in the bordering villages of all the three areas. Household holding size at Sonamura of backyards ranges from 5 to 50 chickens, 5 to 50 ducks, and 1 to 6 geese. Average holding capacity at Jaigaon ranges from 3 to 15 for native chicken, and 7 to 10 ducks. No geese could be found in Jaigaon. In Moreh border, every household keeps backyard chickens with holding sizes ranging from 5 to 15. Some people are also rearing Muscovy ducks with holding sizes ranging from 5 to 25.

Usually all species of poultry goes for scavenging during daytime in homestead areas and nearby agricultural lands. Ducks and geese go for scavenging in drains and abundant water bodies that are available in all the areas under study.

No vaccination or medication is done for backyard poultry. High mortality rates of backyard poultry is a normal phenomenon.

Backyard poultry is reared for both for egg and meat purpose. The production meets mostly the local demand. There is little movement of native poultry outside the villages.

In case of Jaigaon, ducks from villages on the Indian side are regularly traded. The price of ducks in the villages during the study period ranges from Rs.200-300 (USD 6). Local aggregators are active in the area.

Similarly, in the case of Sonamura and Moreh, some aggregators likewise gather indigenous chicken and eggs from villages to sell in the main market.

None of the areas under study have breeding stock farms for fertile eggs. There are no processing houses, hatcheries, manure stores, or storehouses.

Practice of disposal of dead bird/manure/poultry offal and feathers:

Some informants in the Jaigaon area reported the practice of eating dead birds; many farmers in all the three areas throw dead birds in the roads, rivers, or other water bodies. Poultry manure is generally used in the agricultural farms in all the areas. Poultry offal is generally dumped in a dumping pit in the market area in all cases.

Indicator 7

Road network and movement corridors:

Sonamura: The approach road from Agartala to Sonamura is National Highway 44. Poultry and poultry products enter Sonamura through this road. After Bisramganj this National Highway leads to state highways to reach Sonamura. There are many roads to enter Bangladesh through open border of 17 km. Village roads and gravelled motorable roads are also there. All informal movement of poultry and products to Bangladesh are effected through these roads. National Highway 44 enters Bangladesh through a formal crossing check gate near Agartala at Akhaura. There is no formal or informal movement of poultry and poultry products to Bangladesh through this formal check gate. Domestic flight operates from Agartala Airport. There is no railway network. Sometimes DOCs are transported through this airport.

Jaigaon: National Highway 31C leads to Jaigaon that enters Bhutan through Phuentsholing. Formal export of frozen chicken, as well as all poultry and poultry product movement to Jaigaon goes through this road. Hasimara railway station is about 12 km. from Jaigaon. This railway station has no role in the movement of poultry and poultry products. There is a proposed railway line across the Indo-Bhutan border at Jaigaon. The nearest airport is at Bagdogra, 160 km. away from Jaigaon.

There are formal check gates at Phuentsholing and at the Chinese line near Jaigaon. There are two porous crossing points, one at Upper Khokla Busty, and another at Bangey Bazaar. Both of the roads are not motorable, and no check point is present although it can be crossed by villagers. Informal movement of poultry and poultry products happens through these points.

Moreh: National highway 39 from Imphal leads to Moreh. Movement of poultry and poultry products happens through this highway from Imphal to Moreh. There is no railway network. Domestic flights operate from Imphal airport approximately 120 km. away from Moreh. Sometimes DOCs and BHEs are brought through this airport by the traders at Imphal. There are four legal crossing points with check gates, and two porous border crossing points (Shiva gate and Raju gate) which local residents use. Most of the informal movement of poultry and poultry products happens through these porous crossing points.

Rivers:

Sonamura: Gumati River crosses the Indo-Bangladesh border but is not used for the movement of poultry and poultry products.

Jaigaon: Toorsha River is the major river at Jaigaon across the Indo-Bhutan Border; the other two rivers crossing through the area are Barsha River and Singrey River. There is no movement of poultry and poultry products through these rivers.

Moreh: There are three rivers at Indo-Myanmar border crossing; these are Khujeirok, Leirok and Lokchou. Poultry and poultry products are not transported through these rivers.

No maritime ports are in any of the areas.

Status of HPAI at source point of products at movement corridors:

There is regular episodes HPAI outbreak in the West Bengal state of India which is one of the major source points of DOC and feed for each of the three border areas under the study.

Indicator 8

None of the areas under study have national or regional live bird markets although there are local live bird markets in every area. One of the biggest local markets supplying to all the three places is located at Falakata of West Bengal. Live birds are being supplied from Falakata market in the places under study as per the demand and supply scenario.

There is no separate market for live broiler in all the three places. Live poultry is sold in the wet market. Different species of birds are kept in the same enclosure in the market for selling. Dressed meat is also sold from the same counter for live birds.

Unsold birds are taken back to home by the traders in all the three places. There are laws in effect which require traders of poultry meat to register except for border trade registration in all the three places. There is no mandatory rest day for market places of poultry and poultry products.

There is poor cleanliness and hygiene of the wet poultry meat and egg market. Poultry offal and feathers are dumped in the dumping pit which is cleared by market/municipal authorities from time to time. The traders of Moreh border throw feathers and offal at the river running through the border area.

Sonamura: Four major local markets for live birds, one each at Sonamura town, Melagharh, Biramganj, and Bishalgharh. Numerous small markets in the different villages and a thriving trade of duck and duck eggs during the winter season.

Jaigaon: Two major markets of live broiler – Super market and Bow Bajar. There are numerous small markets in different villages.

Moreh: Three major local markets of live broiler – Moreh Bazaar, Super market and Morning Bazaar. There are numerous small markets in different villages.

There is a presence of illegally-imported products in all the areas except Jaigaon which is generally legal, highly seasonal, and demand driven. There is trade of eggs and native chickens from Myanmar at the Indian side of Moreh town.

Indicator 9

Sonamura: There is a DOC aggregation point near the border crossing (informal). The quarantine station is not functional.

Jaigaon: Local agents are facilitating cross border trade of frozen chicken with Bhutan. There is a functional quarantine station, with spraying of vehicle being done by personnel of both sides of the border.

In all the areas there exists local live broiler market at the crossing points.

Indicator 10

Sonamura: Thickly populated agriculture area is the sub-division of West Tripura District. Neermahal at Melagharh is a major tourist attraction. There are a few places of religious importance in the area. A remarkable number of the population migrated to the border area for small trade with other parts of the subdivision.

Jaigaon: The population is composed of migrants from different parts of India and other countries like Bangladesh and Nepal. Jaigaon is the main place of market for residents of Bhutan near the border point at Phuentsholing. It is the transit point for a large population going to work as semi-skilled or unskilled workers in Bhutan. There are a few military camps near the Bhutan border.

There are a large number of factories near the border in Bhutan at Bangey bazaar. A remarkable number of the population of Jaigaon thrive on small trade with Bhutan. A large number of refugees reside near Jaigaon. There are also residents composed of poor tea garden workers working in the tea gardens near Jaigaon.

Moreh: It is considered to be one of the major towns of Manipur. There is a large defense population on the approach to or near Moreh. The different defense camps at Moreh are Manipur Police, Manipur Rifles, Indian Reserve Battalion, and Assam Rifles. A portion of the population at Moreh is dependent on petty trading. There is one pilgrimage site—“Kundo Leirembi”—and is one of the main attractions for Meitei Manipuris.

Indicator 11

Sonamura: Legal check points are managed by defense personnel. The Border Security force is posted on duty in different points at Sonamura at Indo-Bangladesh border. Trade of poultry and poultry products are banned between India and Bangladesh.

Jaigaon: The border crossing point at Phuentsholing is managed by defense personnel from Bhutan. Indian defense force is posted in different places near the Indo-Bhutan Border. There is quarantine station at Phuentsholing. Frozen chicken is legally exported from India to Bhutan.

Moreh: The Indo-Myanmar border is managed by defense personnel both from India and Myanmar. There are seven checkpoints on the way from Imphal (the capital of Manipur) to the Moreh border. There is no legal trade of poultry and poultry products between India and Myanmar.

An anti-smuggling force is in place in the three places under study. There are incidences of confiscation of smuggled goods in all the three places. However, there is no report of confiscation of poultry and poultry products.

Illegal border crossing is possible in all the three places but more so in Sonamura. The local people in all the places are generally aware about the laws of cross-border trade. However, according to them, only experienced traders can manage legal cross-border trade. People in general in all the three places have limited trust on veterinary service rendered by government.

Indicator 12

Sonamura: There is high demand of duck meat and eggs during winter season. Ducks and ducks egg enter Sonamura market from Bangladesh. Prior to Ramadhan there is increase in placement of DOC in poultry farms on the Bangladesh side. This triggers import of DOCs from India. Following the months after Ramadhan, the demand for DOCs in Bangladesh will fall gradually and it will increase in India and thereby there will be reverse flow of DOCs from Bangladesh to India.

There is high demand of live poultry during Ramadhan or Eid Festival that triggers import of live poultry from Indian side. During Puja season (October-December) there is a high demand for poultry meat in the Indian side at the Indo-Bangladesh border at Sonamura that stimulates the importation of live birds from the Bangladesh side. Sometimes price differentials (INR 60 equals to Takka 100) helps in the profit earnings done by cross-border trade.

Example of existing price differentials:

Case I: Rate of DOC in Indian side which is INR 33- 35 is sold at the rate of INR 38- 40 in Bangladesh, i.e., there is profit of INR 3 for Indian traders after deducting the transport cost of INR 2 per chick.

Case II:

Bangladeshi traders can sell their ducks to markets in the Indian side at a rate of Taka 300 which is equivalent to Indian currency of Rs.120 each. This rate is attractive for consumers in Indian side as ducks produced along Indian side generally cost Rs.200 each.

Jaigaon: Bhutan is a highly meat deficient country largely dependent on India for the supply of poultry meat. Because of religious taboos, Bhutanese cannot kill birds, so there is a huge demand for dressed/frozen chicken in Bhutan.

There is legal trade of frozen meat from the Indian side. The price rates of poultry meat and eggs are very high in comparison to the Indian side. There is a huge demand of poultry meat especially during the time of Durga puja (October- November) for the workers employed in the numerous factories near the Indo-Bhutan border. The people from Bhutan come in groups to purchase ducks and chicken from the villages near the border area for household consumption.

Example of price differential

Retail rate of dressed chicken at Jaigaon is INR 120- 130/ kg which is INR 300/Kg at Thimpu Bhutan.

Moreh: A notable number of petty traders trading on different kinds of commodities reside in Moreh town. Rate of poultry and poultry products in Myanmar side is found to be less than the Indian side during the study period. This is due to high cost of transport as a consequence of the long economic blockade on the Indian side prior to study period. There is preference of chicken on the Indian side of the border due to its taste. The native chicken of Myanmar is also sturdy. There is also a high demand for eggs of native chickens coming from Myanmar. Rarely do people from Myanmar bring live chicken and eggs from Tamu point of Myanmar to sell at the Indian side of Moreh. A few informants mentioned that prior to the blockade, prices were lower in the Indian side and there was informal export of broiler chicken to the Myanmar side of the border. Demand by the large defense population in the area is met by contractors who buy chicken from within the state or outside the state.

Example of price differential

Before the economic blockade, poultry meat would cost INR 20- 25—cheaper in the Indian side of Moreh town—thus triggering the flow of live chicken from Indian side to Myanmar. Because of high price increases after the economic blockade, the poultry meat cost almost the same on both sides.

Disease outbreak, especially HPAI triggers movement of poultry and poultry product within and outside the border.

Findings of the stakeholder Analysis and review of preparedness:

The objective of the stakeholder consultation both at local level as well as at a central place was aimed primarily at validating the findings. The activities provided an opportunity to the core team to assess the preparedness of stakeholders in each border areas. Details of each meeting, e.g., flow and nature of participants along with their reflections is presented in Annex III.

An analysis of observations made by the research team indicates that there are diverse interests amongst the stakeholders as far as future HPAI containment operation is concerned. Small backyard farmers are interested in protecting their assets and livelihood.

Commercial small producers on the other hand are interested in minimizing losses. Traders are interested in recovery of their investment, etc.

Government officials are not getting required public support. There is limited incentive for government veterinarians for being vigilant against the outbreak of HPAI.



Stakeholder consultation at Sonamura



Stakeholder consultation at Jaigaon



Stakeholder consultation at Imphal



Central stakeholder consultation, Guwahati

All the study areas are deficient in active farmer or trader associations. Stakeholders across value chains hardly get opportunities to interact amongst each other. There is only occasional communication from government agencies. The goodwill needed for participatory actions are inadequate. Except in Jaigaon where there is a working *panchayat* (village self government) system of governance, government service delivery is generally very poor and never reaches backyard farms.

Overall the analysis indicated poor preparedness on the part of stakeholders in all the areas covered under the study.

Perception of risk of HPAI in the area under study:

The elements carrying risk of HPAI can be broadly explained in two categories:

1. Elements which are common to all the three areas.
2. Elements which are specific to each area.

Common elements:

1. Largely inadequate knowledge about risk of HPAI amongst the native residents near border areas.
2. High risk husbandry practices especially in backyard poultries.
3. Inadequate reach of veterinary service.
4. Weak institutions/reach of institutions.
5. Presence of multiple triggers of informal and unsafe cross border movements of poultry and poultry products.
6. Place/s of origin of input (feeds and DOCs) for commercial broiler farming for the areas under study has known history of multiple incidence of HPAI outbreak.
7. Transitory nature of population in border areas.

Specific elements:

Sonamura: Large open border area with easy access and transport of goods on both sides of the border.

Jaigaon: High demand of poultry and product with high price difference in Bhutan. A large number of factories near the border.

Moreh: Insurgency may have contributed to stimulate unsafe cross border trade.

Conclusions and recommendations

Conclusions:

The field study draws the following conclusions with respect to the integrated characterization of three cross-border areas of India for the risk assessment of HPAI from a socio-economic perspective:

- **Awareness level:** There is inadequate level of awareness amongst the value chain actors of poultry and poultry products on the bio-security levels to be observed for safe farming and trade practice.
- **Triggers for informal cross border trade:** The main triggers for cross-border trade are porous borders, demand and supply scenario on both sides, and presence of small traders and poor communities in border points.
- **Provision of veterinary and animal husbandry service:** The provision of veterinary services in the border areas is highly inadequate. Death of large numbers of poultry in border area goes unnoticed and undiagnosed. Commercial broiler farmers take advice of the input supplier rather than relying on qualified veterinarians.
- **Compensation structure:** The current compensation structure of Government of India for HPAI affected farmers is largely inadequate to attract farmers to cooperate with containment operation in case of outbreaks. The rate of compensation per bird is less than 40 percent of prevailing market rates. The rate for Broiler Hatching Eggs is equal to table eggs which is far lower than the prevailing market rate.
- **High-risk husbandry practices:** Due to lack of awareness on bio-security measures, there is a presence of many high-risk husbandry practices. Allowing the mixing of different species of backyard poultry is common practice. There is even mixing of native poultry with commercial broilers in farms. Some small farmers keep broiler chickens of different age groups in the same shed. Improper disposal of poultry litter, dead birds, and offal is prevalent. There is also a practice of the consumption of dead birds in Jaigaon area. Duck farming is linked with water bodies and wet rice cultivation. There is mixing of backyard chicken with wild birds.
- **Prevalence of diseases at point of origin of poultry and poultry product:** The state of West Bengal is one of the largest suppliers of poultry inputs and live

poultry to Tripura, Jaigaon and has a history of having the highest number of reports of HPAI outbreaks.

- **Movement of poultry and poultry products:** There is wider geographical movement of commercial broiler chicken inputs (BHE, DOC, feeds), followed by live broiler within and outside the states of origin. There are many instances of panic movement of live broiler within and outside the state in the event HPAI notification.
- **Risk with backyard poultry:** Although many times it goes unnoticed due to limited movement, there is a high density of backyard poultry (duck and chicken) in border areas. With most of the outbreaks of HPAI reported in backyard poultry in the respective states of the areas under study, backyard poultry rearing is running an “unnoticed” risk of spread of HPAI. It is suspected that ducks pick up HPAI infection from migratory birds visiting the water bodies and remain as carrier whereas chickens get infected from carrier ducks.
- **Unhygienic wet market and high risk practice:** The wet market in all border areas is highly unhygienic with inadequate facilities for disposal of poultry offal and dead birds. Traders of live broiler keep different species and age groups of birds together. Dressed chicken are sold from the same counter where live birds are also being sold. There are no mandatory market rest days for cleaning of market space.
- **Issues of security concern:** There are issues concerning security in Moreh border area with large number of extremist group present in the area. Intervention in this area either by government authority or other development agency with long term goal is a difficulty.
- **Quality concern of inputs:** There is serious concern about the quality of commercial broiler inputs in many areas. With no quality checks by public authorities, farmers and traders are very concerned about the quality standards of commercial broiler feedstuffs and DOCs imported from outside the state into the country.
- **Market regulation:** There is no operational regulatory system for poultry and poultry product trade. Prices of BHEs and DOCs are unpredictable. There are huge discrepancies in prices of DOCs and feed with opportunists creating artificial crises. The quality and price of many broiler feed (contributing more than 70% on the cost of production of broilers) brands are always under suspicion. Only few big traders are virtually controlling the price of poultry and poultry products. Costs of production of live poultry are not known in many instances. The relationship amongst different elements contributing to costs of

production of live broiler, and mechanisms for fixing up retail consumer price is not known to a large number of small-scale farmers. These information gaps lead to huge losses to farmers in many instances.

Recommendations:

- 1. Mass awareness:** Mass awareness campaign is to be carried out with the following themes:
 - 1) **Safe poultry production and marketing system:** Emphasis should be given to the implementation and management of low-cost biosecurity measures. Scientific knowledge about the commercial broiler production systems, transport and trading should be included in the awareness program. Food safety issue linked with production, transport and marketing system should be highlighted.
 - 2) **Prevention and containment of HPAI:** Knowledge about the steps that a farmer, trader, transporter, or consumer should observe to minimize chances of occurrence of HPAI should be disseminated through carefully crafted messages. Educating the value chain stakeholders about the importance of prevention of the spread of diseases to human, as well as the ways and means on how they can participate, etc., should be emphasized.
- 2. Creation of volunteers:** Volunteers from every village should be created as part of disaster preparedness.
- 3. Development of fair trade system:** Quality and price monitoring and information mechanisms should be developed for fair trade and equal participation of all value participants. This should be aimed at removing discrepancies in the pricing of inputs and live broiler chicken in different areas. The opportunists taking advantage of situations should be discouraged by this system.
- 4. Shielding of porous border:** The porous border areas, should be guarded wherever possible to prevent illegal cross border trade.
- 5. Provide bio-secure model of poultry production in border areas:** The poultry farmers of the border areas should be encouraged to adopt more bio-secure models of backyard poultry rearing by imposing restriction on movements.
- 6. Training of Barefoot veterinary service link man:** Selected persons from villages should be trained with basic knowledge in husbandry practices to serve poultry farmers at their own doorstep. They can also assist state departments in regular disease surveillance.

- 7. Revision of compensation structure:** The compensation structure for affected farmers should be revised so as to meet at least the prevalent market rate of poultry and poultry products. Proper reporting and participation of farmers in surveillance and containment operations is needed.
- 8. Hygienic market shed for poultry and poultry products:** Different local public authorities, market regulatory committees and civil society organization should be sensitized to provide more hygienic and separate market sheds for trading of live fowls and dressing poultry carcasses.

Constraints and challenges:

- 1. Time factor:** Conducting study in three different locations in three different states within a limited time period was a challenge for the study team.
- 2. Insurgency issue:** Free movement of the study team in the Moreh border was restricted due to the issue of insurgency.
- 3. Lack of authenticated secondary data in public domain:** The team had initial difficulty in sourcing basic updated information on human population, area dimensions, livestock and poultry populations, authentic maps of the area under study, etc.

Annex I: Details of local field team

Name of the area	Name of the person	Academic qualification	Position in field team
Sonamura	Mohan Miahn	Graduate	Local field coordinator
	Aminul Islam	Graduate	Local field researcher
	Delwar Hussain	Graduate	Local field researcher
	Ahim Kr. Das	Graduate	Local field researcher
	Shamimul Islam	Graduate	Local field researcher
Jaigaon	Mr. Narayan Pradhan	Graduate, trained as bare foot veterinary practitioner	Local field coordinator
	Mr. Caliph Cristi	Graduate	Local field researcher
	Mr. Prem Pradhan	Graduate	Local field researcher
Manipur	Mr. Maqbul Ali	PhD scholar, Sociology	Local field coordinator
	Mr. Tajuddin	PG in Sociology	Local field researcher
	Mr. Zakir Ali	H.S. trained as veterinary field Assistant	Local field researcher

Annex II: Details of the key persons interacted with:

The core study team interviewed different persons in three different areas to generate understanding about the 12 pre-defined indicators under the study. The list of key persons is exclusive of the list of informants interviewed by local field teams in the different areas under study.

A total of 42 persons from three study areas were interviewed as key informants for their respective areas.

The breakdown of the total number of key informants is: nine (9) farmers, eleven (11) traders, nine (9) Government officials, and thirteen (13) representatives from non-governmental or private organizations. Summaries of the interviews are given below:

Details of interviews with key persons:

Date of meeting	Name of the person/ Designation	Issues discussed	Outcome of meeting
Sonamura, West Tripura, Tripura, India			
30/06/2010	Dr. Nurul Islam, Subject Matter Specialist, Krishi Vignan Kendra, Tripura	Secondary basic information on Sonamura, activity on Poultry husbandry on the area. Request for reliable contacts to conduct the study.	Basic information about the area could be obtained. Few contacts and references obtained.
	Mr. Govinda Malakar, Sales Executive Smart feeds	On key actors and places in on poultry value chain in the state of Tripura	Fair understanding about movement of poultry and poultry products and practice in place.
01/07/2010	Dr. Ashish Bhattacharya, Disease Investigation Officer, Tripura, Dep't of Animal Resources, Tripura	Basic information about surveillance activity in Sonamura and basic infrastructure facilities at Sonamura	Personal reference to Dr. A. Roy Burman, Director, Animal Resources, Govt of Tripura
	Dr. A. Roy Burman, Director AR	About the objectives of the study, scope and area coverage. Requested for basic information regarding status on surveillance activities.	Received generalized information about the status of disease surveillance activities in the state of Tripura.
	Mr. Bijon Saha, Branch Manager	Inquired about basic information on poultry	Shared some useful information.

“Integrated characterization of Three cross-border areas of India for the risk assessment AND TARGETED COORDINATED interventions of HPAI: a Socio-economic perspective”.

Date: 15th August 2010

Date of meeting	Name of the person/ Designation	Issues discussed	Outcome of meeting
	NEDFi	production and marketing activity in the state from the point of view of financial assistance to projects.	
	Mr. Joydev Paul, Trader	Basic understanding about poultry production and marketing system in Tripura	Could Map movement of poultry and poultry products and practice adopted in General
	Mr. Gauranga Paul, Trader	Do	Do
	M. Rupam Paul, Trader	Do	Do
	Mr. Mohan Miah, Secretary of Jarina welfare Society (NGO)	About requirement of local field personnel to conduct study at Sonamura	Time and date fixed up to move to Sonamura
2/07/2010	Mr. Delwar Hussain Mr. Ashim Kr. Das Mr. Aminul Islam Mr. Shamimul Islam	Details about the study	Fixing up of Local field team
3/07/2010	Mr. Bolai Shaha	Poultry production system in practice	Many high risk practice indentified
06/07/2010	Mr. Khurshed Alam Khukon, Farmer cum trader	Regarding informal cross border trade through indo-Bangladesh border	Confirmed export of Day-old-Chick through Indo-Bangladesh border
08/09/2010	Dr. D.K Nath, Leading Private Veterinarian	Issues ranging from poultry production and trade system and emerging issues of bird flu.	Re-assured many of the findings of field study. Re confirmed on inadequacy of awareness on HPA I.
29/7/2010	Mr. Swapan Saha, Trader at Sonamura	On the findings of field study and invitation to stakeholder meeting	Valuable inputs on movements of poultry and poultry products and practices in place.
Jaigaon, Jalpaiguri District, West Bengal, India			
14/07/2010	Mr. S. K. Pradhan, Chief Advisor and Founder, Jaigaon Samaj Kalyan	Informed about the proposed study, are to be covered and requested for cooperation.	Received a number of references. Gathered basic idea about the area.

“Integrated characterization of Three cross-border areas of India for the risk assessment AND TARGETED COORDINATED interventions of HPAI: a Socio-economic perspective”.

Date: 15th August 2010

Date of meeting	Name of the person/ Designation	Issues discussed	Outcome of meeting
	Sangh		
	Mr. Robin Rai General Secretary, Jaigaon Samaj Kalyan Sangh	Requested for references and guidance to conduct the study	A brief sketch about the area is received. Guidance received to approach with the field action plan.
	Mr. Santosh Naag, Trader	About poultry production and marketing scenario of Jaigaon area.	Understanding about the poultry value chain gathered.
	Mr. Narayan Pradhan, Barefoot Livestock Service Provider	Objective of the study, area to be covered, type of requirement of personnel for the purpose	Helped in selection of personnel for local field study
15/07/2010	Mr. Kalu Lama, Member of a SHG	Husbandry practices in poultry production	Get indication about high risk practices.
	Mr. Biswajit Rai, Executive Assistant, GPII, Jaigaon	About basic information about Jaigaon. Role played by Panchayat in relation to public hazard like HPAI outbreak	Got indication about inadequate awareness and sensitization at Panchayat level in respect of HPAI
	Ms. Leela Tamong & Mrs. Kancha Tamong, Small scale broiler farmer Bordering Village near Indo- Bhutan border	Tried to find out high risk husbandry practices and movements of poultry and poultry products	Could understand many high risk practices adopted by farmers. Evidence gathered on cross border movement of poultry and poultry products.
	Mr. Dhanraj Tamang and Mrs. Lachimaya, farmer cum trader at border point	Exploration on cross border movement of poultry and poultry products.	Understanding on dynamics of cross border movement of poultry and poultry products and triggers for such movements.
16/07/2010	Abu Taher, Trader	Trade in poultry and poultry products	Understanding of the chain
	Mr. Gamaney Lama, Farmer (backyard)	Reach of veterinary service	Indication on insufficiency of veterinary service
	Dr. M.K. Dey, Veterinary Block Extension Officer	About Surveillance activity, role played by Veterinary department in poultry production system, adequacy of service	Fair idea about reach of veterinary service in grass root level, idea about inadequate public relationship with vet department.

“Integrated characterization of Three cross-border areas of India for the risk assessment AND TARGETED COORDINATED interventions of HPAI: a Socio-economic perspective”.

Date: 15th August 2010

Date of meeting	Name of the person/ Designation	Issues discussed	Outcome of meeting
3/07/2010	Mr. Lalman Lama, Farmer cum trader	Poultry and poultry product trade in Bhutan	Understanding price of poultry and poultry product in Bhutan is very high
	Abu Shaheed, Trader	Poultry trade trend during last few years	Understood that poultry and poultry trade in Jaigaon has decreased due to Ban by Bhutan Govt on purchase of Product from open market. Though informal trade is happening.
Moreh, Chandel District, Manipur, India			
10/06/2010	Dr. Shanti Kr. Singh, Veterinary Assistant Surgeon, Imphal	Requested for some references at Moreh for field study.	
	Mr. Sanjenthong, Forest Ranger, Wild Life Sanctuary, Moreh	Requested for cooperation to conduct study at Moreh.	Assured cooperation on request by formal letter.
	Dr. I.B. Singh, Veterinary Assistant Surgeon, Imphal	Requested for basic information about Moreh and reference for recruitment of local field team	Could provide some basic information for the state of Manipur.
11/07/2010	Mr. Maqbul Ali, Sociologist	Regarding the objective of the, scope and area to be covered by the study. Requirement of field team members	Helped in recruiting local field team members.
24/07/2010	Dr. Rajkumar, Trader	To understand poultry production and marketing system in Manipur	A fair knowledge is gathered about the sector.
	Vermaji, Trader	Regarding movement of poultry and poultry products	Helped in mapping the routes and actors.
	Mr. Krishna, farmer cum trader	Understanding about high risk husbandry practices	General idea gathered
25/07/2010	Noor Muhammad, Member of Moreh development committee	Trade practices of poultry and poultry products in Moreh	Identified incoming and outgoing products with triggers for such movements
	L. P. Singh, Trader	Cross border movement s of poultry and poultry products	Gathered evidences and triggers of movements

“Integrated characterization of Three cross-border areas of India for the risk assessment AND TARGETED COORDINATED interventions of HPAI: a Socio-economic perspective”.

Date: 15th August 2010

Date of meeting	Name of the person/ Designation	Issues discussed	Outcome of meeting
	Mrs. N. Nessa, Backyard farmer	Regarding husbandry practice in backyard poultry	Identified few high risk husbandry practices
16/07/2010	Mr. Liyakat Ali, Trader	Trade practices, actors and seasonality	Evidence for few indicators gathered.
	L. Surendra Singh, Kuroiler farmer	Regarding farming system of Kuroier bird	Understanding cycle of production
	Sheikh Abdullah, Social worker	Issues of emerging diseases like bird flu and response of society	Fair understanding about awareness level of famers on issues of HPAI

Annex III: Notes on each of the stakeholder consultations:

Sonamura, Tripura, India, 31 July 2010

A total of 35 participants composed of farmers (both backyard and commercial broiler chicken), traders, NGO workers, and *panchayat* (Village self government) members attended the consultation meeting. The meeting started with a brief presentation on objective, scope, activities conducted in the area. Field team members are then introduced to the participants. The local field team members presented their findings as a group in the local language under the guidance of the visiting principal field researcher. The participants conveyed their satisfaction on the findings.

Following are the few general points noted during the consultation:

1. Farmers in Sonamura in particular and State of Tripura in general are suffering from poor quality of feed and DOC. This is hampering the growth of business and competitiveness. The participants highlighted illegal border trade as one of the reason for the fall in quality of various inputs like feed and DOCs.
2. Participants agreed on the fact that practice of bio-security is inadequate particularly amongst small farmers. Self medication by farmers is common. They highlighted poor veterinary and extension services in the border areas.
3. Participants highlighted need for streamlining poultry marketing. Some suggested for setting up of processing centers as according to them the area has the potential to produce as per supply need of such unit if established.
4. Most of the participants are not in favor of illegal inflow of poultry products from Bangladesh as this leads to unhealthy competition and potential spread of diseases. The local poultry association is trying to implement a ban on poultry trade from Bangladesh.
5. The participants reacted to the findings of high risk practices. Many indicated that knowledge of majority of stakeholders regarding this is very limited.
6. Participants noted that accessibility of veterinary service is highly inadequate. “Fire brigade approach” is in practice in the area, especially during the occurrence of emerging highly pathogenic disease like Avian Influenza.

Jaigaon, West Bengal, India, 4th August, 2010

A total of 28 participants composed of farmers (both backyard and commercial broiler chicken), traders, *panchayat* (Village self government) members and social activists attended the consultation meeting. The meeting started with a brief presentation on objective, scope, activities conducted in the area. The facilitator then described the findings one after another and moderated a discussion on each. The participants were satisfied with the area coverage and number of representative interviews conducted under the scope of the study. The participants actively debated on various findings of the study and helped the study team to arrive to certain conclusion points with respect to findings. Towards the end of the meeting, recommendations were noted down based on the views expressed by the participants. The table below summarizes the reflection of various stakeholders in respect of findings of the study:

Findings of the study	Reflections of stakeholders	Conclusion	Remarks
Farm numbers in the border area are limited and they are small in size. The production can hardly meet the local demand	The average capacity of farms in the area ranges from 100 – 200. Some farmers purchase 20 – 25 days old broiler or Kuroiler (Colored bird) and rear along with their backyard poultry up to marketable age	Population is limited and mostly backyard including duck.	Growth is demand driven.
Duck rearing is in practice.	Duck rearing is in practice in Khukla, upper Khukla basty near the Bhutan border. Farmers of the area would purchase ducklings from Shisu bazaar about 10 – 15 Km from the area (Indian side) especially during the month of May’ and would rear up to month of September- October. People from villages nearby the border area, (mostly from Bhutan side) purchase these ducks for local consumption. The price of the live duck ranges from 200 to 300 per adult duck depending on supply.	Backyard duck farming is demand driven and highly profitable.	
There is movement of live / frozen chicken to Jaigaon from other parts of West Bengal	Most of the demand of live broiler requirement in Jaigaon area is met by supply of live bird from farms under contract growing located at Falakata of West Bengal (India). The local Jaigaon market sells an estimated 1000 kg of live bird per day. There is existence of legal export frozen chicken from India.	There is a vibrant trade of poultry products between India and Bhutan.	

Findings of the study	Reflections of stakeholders	Conclusion	Remarks
Surveillance activity in the villages near the border is poor.	There is no regular visit of government veterinary officials in the border area. Panchayat needs more support to render services.	Reach of the veterinary service is inadequate.	There are two trained workers (trained under government scheme as bird flu link man) in the area.
Knowledge level of farmers about HPAI And level of reporting of suspected cases is poor.	There are confusions amongst various levels of people regarding HPAI. People in general are aware of the disease as one that leads to death of birds (including forced culling). Participants are not sure about symptoms and its seen / unseen consequences. Incidences of high mortality amongst the backyard poultry is not reported many a times as people consider it natural. Commercial Broiler chicken farmers however, do look for solutions in case of high mortality.	Inadequate knowledge of HPAI amongst various stakeholders.	All stakeholders are very much conscious about likelihood of the disease to infect human being. They are not sure as how to prevent spread of HPAI.
Poor bio-security measures in practice by farmers.	This is due of poor knowledge in scientific husbandry practice. Small scale farms cannot provide adequate bio security coverage due to constraint of money.	Inadequate knowledge level related to scientific rearing / adequate accessibility to information is the root cause of poor bio-security practice by the farmers.	Traders in the area feel that since population of bird in area is very less, poor bio security measures in the existing farms would only have very little influence on overall scenario.
Availability of wild bird in the Jaigaon	Catching of wild bird is not practiced in the area. But they come to rest in the water bodies in and around the area.	A number of wild birds come to the water bodies where local breed of bird goes for scavenging.	Stakeholders are aware that wild birds are one of the carriers and spread the disease.

Findings of the study	Reflections of stakeholders	Conclusion	Remarks
Keeping of different species of bird in households.	It is a common traditional practice.	Keeping different species of birds in backyard and allowing mixing is a common practice.	Backyard farmers feel the disease bird flu was carried to the state by commercial “chicks” from outside.
Presence of Cross border movement of poultry and poultry products.	People from Bhutan side will come to Jaigaon to purchase live Ducks, chicken and eggs from market and villages of Jaigaon. There is legal trade of frozen chicken (from Indian side for consumption in Bhutan)	Illegal cross border movement is in practice and is usual for the local resident of both side of the border.	The Duck have more demand in Bhutan especially in winter season.
The practice of disposal of poultry offal, feathers, dead bird is very poor	There is practice of consuming dead birds. Most of the people throw dead birds in the road side pit or to river.	Un safe system of poultry waste disposal.	People in general are un aware about the risk and as such are less concerned.

The meeting suggested the following points for management of HPAI.

1. Extensive awareness campaign about the disease, bio-security measures, etc., especially amongst backyard duck and chicken farmers.
2. Strengthening of Panchayat capacity for service delivery, surveillance, participatory development programs, and disease reporting.
3. Increase awareness and enforcement of related hygienic marketing and waste disposal.

Moreh, Manipur, India, 10th August, 2010

A total of 25 participants composed of farmers (both backyard and commercial broiler chicken), traders and social activists attended the consultation meeting. The meeting started with a brief presentation on objective, scope, activities conducted in the area. The

facilitator then described finding one after another and moderated a discussion on each. The participants were satisfied with the area coverage and number of representative interviews conducted under the scope of the study. The participants actively debated on various findings of the study and helped the study team to arrive to certain conclusion points in respect to findings. Towards are end of the meeting recommendations were noted down based on the views expressed by the participants.

The table below summarizes the reflection of various stakeholders in respect of findings of the study:

Findings of the study	Reflections of the stakeholder	Conclusion	Remarks
<p>Number of farms in the border area is limited.</p> <p>The average size is less than 50 in most cases.</p> <p>Rearing of colored bird in common.</p>	<p>Kuroiler (colored bird) farming is getting popularity in Manipur day by day. There is 5-6 numbers of Hatcheries hatching Kuroiler eggs. The hatcheries collect fertile eggs from Kuroiler farmers directly. Rate of each Kuroilier egg is Rs.7/- per egg (0.16 USD) It is estimated that there are placement of about 60, 000 – 1, 00, 000 Kuroiler chick in Manipur every five days, i.e. there is about 0.36 to 0.6 million Kuroiler chick placement in Manipur in a month. The rate of Kuroiler chick is Rs. 25/- (0.56 USD) and live bird is Rs. 170 – 180/- Kg (4USD). Farmers raising Kuroiler for Meat purpose would rear Kuroiler on commercial broiler feed which will allow attainment of body weight of 3 kg in three months in case of Male and 2.5 kg for female.</p>	<p>Emergence of colored broiler farming may be linked to demand from the other side of the border besides consumer preference within Manipur.</p>	
<p>There is no collection of samples from poultry</p>	<p>There are even no basic veterinary services in the Moreh area. Self Medication is a common practice in these areas.</p>	<p>Reach of the veterinary service is in adequate.</p>	<p>Commercial broiler farmer would take advice of input dealer where as backyard poultry holder would resort to home medication.</p>
<p>Knowledge level of farmers about HPAI And level of reporting of suspected cases is</p>	<p>There are confusions amongst various levels of people regarding HPAI.</p> <p>People in general are aware of the disease as one that leads to death of</p>	<p>Inadequate knowledge of HPAI amongst various stakeholders.</p>	<p>Backyard farmers are very much conscious about likelihood of the disease to infect human being, where</p>

Findings of the study	Reflections of the stakeholder	Conclusion	Remarks
poor.	<p>birds (including forced culling).</p> <p>Participants are not sure about symptoms and its seen / unseen consequences.</p> <p>Incidences of high mortality amongst the backyard poultry is not reported many a times as people consider it natural.</p> <p>Commercial Broiler chicken farmers however, do look for solutions in case of high mortality.</p>		as commercial broiler farmers are more concerned about its potentiality to cause loss to business.
Poor bio-security measures in practice by farmers.	The stakeholder feels that this is true and is because of poor knowledge in scientific husbandry practice.	There is Inadequate knowledge level in scientific rearing and accessibility of information is poor.	Stakeholders other than those directly linked to poultry business are less conscious about disease risk aspect of poultry production and trade system.
Availability of wild bird in the Moreh Market	Catching and taking meat of wild bird is normal.	Catching of wild bird is in practice at Moreh.	Stakeholders are not aware about the underlying risk of catching wild birds.
Keeping of different species of bird in households	It is a common traditional practice.	Keeping different species of birds in backyard and allowing mixing is a common practice.	Backyard farmers feel the disease bird flu was carried to the state by “commercial chicks”
Presence of Cross border movement of poultry and poultry products.	<p>People from Myanmar side will come with their chicken and eggs to sell in Moreh border.</p> <p>Movement of poultry and poultry products has decreased from Indian side after economic blockade⁸.</p> <p>There is high cost of farm input in the area. This may be due to economic blocked mentioned above. The rate of</p>	<p>Illegal cross border movement is in practice and is usual for the local resident of both side of the border.</p> <p>Legal trade through the border is likely to increase in the years</p>	The egg from Myanmar have more demand in Indian side than Chicken due to its taste (yolk color)

⁸ The State of Manipur suffered economically from a political agitation where activist from a neighboring state blocked transport of essential goods from mainland India for more than two months starting from May'2010

Findings of the study	Reflections of the stakeholder	Conclusion	Remarks
	<p>feed during the study is Rs. 30 – 35 / Kg (0.67 USD) which is more than double the normal market rate. The rate of Day old chick is Rs. 40- 45/- (up to 1 USD)</p> <p>The lengthy economic blockade has lead to political sensitization. There is now urge for facilitating legal trade of food products to Manipur from Myanmar.</p>	to come.	
Disposal of poultry offal, feathers, dead bird is very poor	Dustbin provided by the authorities is not enough.	Un safe system of poultry waste disposal.	Un aware about the risk, people are less concerned.

Central Stakeholder consultation: Guwahati, Assam, India. 13th August, 2010

The meeting was conducted with an objective to discuss in detail the draft report of the study which was prepared based on one to one interview of key informants and consultation with local stakeholders. A total of 14 participants attended the meeting. Among the participants included two members each from the three local field teams, members of core research team and members of the honorary research support group who are mostly affiliated to Assam Agricultural University and local government veterinary department.

A copy of the draft report was shared with all the participants before the meeting.

The meeting started with a detail presentation on the computerized data tabulation process and finding based on observed trends.

Participants more particularly, field team members from three border areas exchanged their views and experiences during implementation of the study. The members of the research support group sought clarification on number of points which was addressed by the members of the core research team.

The meeting also discussed comments on draft report received from FAO-ECTAD and suggested incorporation of same.

The consultation ended with quick note on key learning from the entire exercise and a vote of thanks.