

## Participatory Disease Surveillance Of Highly Pathogenic Avian Influenza (HPAI) In Mangu Local Government Area of Plateau State, Nigeria.

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**Abstract:** Participatory epidemiology is an emerging field that is based on the use of participatory techniques for harvesting qualitative epidemiological intelligence contained within community observations, existing veterinary knowledge and traditional oral history. In the course of this study, different techniques of participatory disease surveillance (PDS) such as simple ranking, proportional piling, seasonal calendar, mapping, transect walk and interview with key informants with the use of check list as a guide was applied in order to acquire data in randomly selected 20 villages in Mangu local government area of Plateau state. Analysis of data indicated that the most dominant livestock specie in this study area are local chickens (poultry). The various poultry diseases occurring in these communities were identified and New Castle Disease (NCD) happens to be the most important disease of poultry based on this study. Free range poultry management system is what is being practiced in all the villages where the study was conducted. Ethno veterinary medicine is very much in practice in the study area. There was absence of Highly Pathogenic Avian Influenza (HPAI) in all the villages where the study was carried out. Some of the challenges encountered by these farmers include diseases, difficulty in getting access to feed due to their limited income and lack of good poultry housing. The use of participatory disease surveillance proved to be a useful tool to collect reliable data that can be utilized for the control/eradication of poultry diseases in Plateau state.

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### 1. Introduction

Participatory epidemiology (PE) is the use of participatory approaches and methods to improve our understanding of the patterns of diseases in populations. These approaches and methods are derived from participatory appraisal. The empowerment of people to find solutions to their own development challenges is called Participation (ILRI, 2009). Participatory appraisal (PA) is a family of approaches and methods that enable people to present, share and analyze their knowledge of life and conditions, to plan and to act. It is participatory, flexible, lightly structured, adaptable, exploratory, empowering and inventive. Types of participatory appraisal include rapid rural appraisal, participatory rural appraisal (PRA), farming systems research and participatory impact assessment (ILRI, 2009).

Participatory Disease Surveillance (PDS) is the application of PE to disease surveillance. PDS is a method of disease surveillance where PA approaches and methods

are used to combine local veterinary knowledge with conventional methods to establish the presence or absence of a specific disease in a particular area (ILRI, 2009). PE is based on communication and transfer of knowledge, using a variety of methods. There are three main groups of methods, (a) Informal interviewing which includes semi-structured interviews with key informants, focus-group discussions or individual livestock keepers, (b) ranking and scoring which comprises of simple ranking, pair-wise ranking, proportional piling and matrix scoring, (c) visualization which comprises of mapping, timelines, seasonal calendars and transect walks. These are complemented by Secondary information sources obtained before going to the study area and as the study is conducted, direct observation of animals, farms, villages is carried out, while in the study area Laboratory diagnostics if available, field diagnostic tests are used, complemented by sample collection and testing by a regional or national laboratory for confirmation. Data are

crosschecked by probing, triangulation and laboratory diagnostics (Pretty *et al.*, 1995; Mariner and Paskin, 2000; Catley, 2005). Participatory Epidemiology relies on the widely accepted techniques of participatory rural appraisal, ethno-veterinary surveys and qualitative epidemiology (Schwabe, 1984). This information can be used to design better animal health projects and delivery systems, more successful surveillance and control strategies or as new perspectives for innovative research hypotheses in ecological epidemiology (Manzoor *et al.*, 2005).

In February 2006, Nigeria became the first country in Africa to report the presence of Highly Pathogenic Avian Influenza (HPAI). Within months, the spread became very noticeable and by September 2008, 25 out of the 36 states of the federation had reported the disease in poultry with only one confirmed fatal human case. To date 97 Local Government Areas (LGA's) of 25 states including the Federal Capital Territory has so far been affected (Bird Flu Watch, 2009).

The failure of formal data-collection methods to produce cost-effective and reliable information for designing rural development projects in developing countries was first recognized in the early 1970s (Chambers, 1983). This problem was related to the behavior and methods of researchers which limited their capacity to understand the problems of the poorest and most marginalized people in rural communities. In response to this situation, alternative systems of inquiry have since been developed. These systems include rapid rural appraisal (RRA) and participatory rural appraisal (PRA) which, to varying degrees, enable local people to play a more active role in defining, analyzing and solving their own problems (Chambers, 1994).

This study was conducted in order to establish the presence or absence of HPAI in Mangu local government area of plateau state.

## **2. Materials and methods**

### **2.1. PDS Team**

The PDS team for this study was composed of four veterinarians.

### **2.2. Methodology**

The villages that this study took place were selected based on location, some in the southern part Mangu, some in the northern part and some in the central region for dispersion of coverage. Before each exercise outing was carried out, pre-advocacy visits were conducted to find a suitable meeting arena in each village according to the suitability of time, place, local politics and convenience for the farmers. Efforts were made to include farmers of all age groups. Materials such as Geographical Positioning System (GPS, GARMIN's eTrex Legend personal navigator), cardboards, counters, permanent markers, digital camera and others were used for the study. Each person was assigned a role before moving out. We always have our note taker, observer, tool applicator and the facilitator. In order to avoid bias, the Participatory Disease Surveillance (PDS) Team did not mention about HPAI during the interview process.

The following tools were used during the course of the participatory disease surveillance: (a)Check list consisting of the following items: mutual introduction, identification of respondents, sources of livestock, livestock species kept, husbandry systems, problems/challenges, poultry diseases, questions and advice, (b)Scoring and Ranking: simple ranking, proportional piling and (c)Visualization which includes mapping, seasonal calendar and transect walk.

### **2.3. Data analysis**

Data was analyzed as indicated in "A Manual For Participatory Disease Surveillance Practitioners: Introduction to participatory epidemiology and its application to highly pathogenic avian influenza participatory disease surveillance".

### 3. Results

Table 1 shows the list of 20 villages and their location in Mangu LGA of Plateau State that were participatory disease surveillance.

**Table 1: List of 20 villages and their location in Mangu LGA of Plateau State were participatory disease surveillance was carried out.**

S/NO	VILLAGES	LATTITUDE N	LONGITUDE E
1	BIDOL	09.26263	009.11790
2	KYAMPUS	09.47519	009.06818
3	KUNGTUP	09.33091	009.21433
4	MWAR	09.14513	009.17923
5	TIM JAHAS	09.32544	009.18341
6	SHIMLANG	09.49103	009.11149
7	DAIKA	09.46333	009.18327
8	KASUWAN ALI	09.55253	009.18820
9	CHANSO	09.57914	009.26061
10	NCHIYA	09.47093	009.12766
11	NIYES	09.38462	009.19584
12	NYEMDUNG	09.20139	009.14893
13	KAHARYAM	09.22634	009.18876
14	DIKHIBIN	09.34894	009.13928
15	KINAT	09.55497	009.11297
16	KOPSHU	09.27576	009.13898
17	BUGAL	09.55665	009.07528
18	JWAKNAPE	09.43283	009.10325
19	GWET	09.45616	009.25626
20	TILANGPAT	09.39599	009.31881

Based on simple ranking, the most abundant live stock specie in the 20 villages in Mangu local government area (LGA) were this study was conducted is poultry, followed by sheep and goats, pigs, cattle and dogs respectively (Table 2 below).

**Table 2: Ranking of livestock species based on their population in Mangu LGA of Plateau state.**

Species	Total score	Ranking
poultry	88	1
Sheep and goats	82	2
Pigs	43	3
Cattle	16	4
Dogs	3	5

Table 3 indicates the various diseases of poultry encountered by the farmers in the 20 villages/communities where this study was done. It includes the ranking of the diseases based on their importance. New Castle Disease (NCD) happens to be the most important poultry disease in the study area followed by fowl pox, syngamus trachea, lice infestation and Chronic Respiratory Disease (CRD). The morbidity and mortality rate of NCD using proportional pilling was 91% and 87% respectively. The case fatality rate of NCD was 96%.

**Table 3: Diseases of poultry, local names and ranking in Mangu LGA of Plateau State.**

Diseases	Local names of diseases in Mwaghavul dialect	Total score	Ranking
New Castle Disease (NCD)	Dyes di piya	100	1
Fowl pox	Ka kwaghal	68	2
Syngamus trachea	Singin/ La pit	48	3
Lice infestation	siyam	40	4
Chronic Respiratory Disease (CRD)	-	12	5

Table 4 indicates the time of occurrence of poultry diseases using seasonal calendar indicated as stated below. NCD based on this study occurs mostly between the months of November to April which is usually the dry season. The peak period of occurrences is said to be January, December and March as seen in Table 4 below. The disease has also been associated with very high morbidity and mortality rates. Some villages however stated that the disease occurs between March to May. Fowl pox is said to occur at any time of the year in most of the villages, indicating that the disease has no specific period of occurrence as indicated in Table 3 whereas in villages like Mwar, Bugal and Kinat the disease is said to occur between March and October and in Dikhibin the disease occurs between October to January. In all the villages studied, syngamus trachea occurs from the month of June to October, that is during the raining or wet season of the year as shown in Table 4 below. Looking at Table 4, lice infestations has no definite time of occurrence, meaning that it can occur at anytime of the year although villages like Gwet and Dikhibin indicated that lice infestations occur between the months of march to April and May to July respectively. Chronic Respiratory Disease occurs from November to January and peaks at December .

**Table 4: using seasonal calendar to determine the time of disease occurrence for poultry in Mangu LGA of Plateau State.**

villages	New Castle Disease (NCD)	Fowl pox	Syngamus trachea	Lice infestation	Chronic Respiratory Disease (CRD)
Niyes	January-April *January	AYR	-	AYR	-
Nchiya	March-April	AYR	-	AYR	November-December and in April
Kasuwan Ali	November-January *December	AYR	-	AYR	-
Chanso	November-April *December, March	AYR	June-August	-	November-January *December
Daika	December-March *January	AYR	-	-	-
Shimilang	November-April *March	AYR	June-August	AYR	-
Tim Jahas	December-April *March	-	-	-	-
Mwar	March-May	March-April	July-August	AYR	-
Kungtup	March-April	May-August	-	AYR	-
Kyampus	March-May *March	-	April-October	AYR	-
Bidol	January-February *January	AYR	-	AYR	-
Tilangpat	March-April *April	AYR	June-October	AYR	-
Gwet	March-May	AYR	June-October	March-April	-
Jwknape	AYR	AYR	June-October	AYR	-
Bugal	January-April	June-July	May-August	-	-
Kopsu	AYR	AYR	AYR	AYR	-
Kinat	March-May	July-October	August-October	-	-
Dikhibin	March-May	October-January	-	May-July	-
Kaharyam	September-November, March-April, June-July	AYR	-	-	-
Nyemdung	AYR	-	June-july	-	-

\*peak season of disease occurrence

AYR....means all year round, the disease can occur at any time of the year

The study revealed that free range poultry management system is what is being practiced by the farmers in the 20 villages of Mangu LGA of plateau state. The challenges faced by the farmers include poultry diseases, difficulty in gaining access to poultry feed due to the low income of these rural farmers, lack of good poultry housing, cases of theft because of the free range system, wild birds (hawk) capturing their chicks at early stage of growth, insufficient knowledge on how to improve poultry production and no access to veterinary services.

Ethno-veterinary practice in the treatment of poultry diseases is still in practice in the 20 villages\communities where this exercise was performed. Traditional remedies involves the use of wild garden eggs (gautan kaji in Hausa language), bark of mahogany tree (madachi in Hausa language) and cactus in treating NCD, while palm oil is used in the treatment of fowl pox. Mapping revealed that people from close villages come on market days to buy or sell chickens, distance ranging from 1-7km apart.

#### 4. Discussion and conclusion

Among the livestock species kept in the 20 villages/communities where this study was conducted, poultry was found to be the most abundant. Poultry diseases seems to have a lot of adverse effect on the local chickens which are being kept under free range management system. New Castle Disease (NCD) is the most important disease that affects these chickens resulting in very high morbidity, mortality and case fatality rates. Based on this study which indicates that this disease usually starts at the onset of the cold dry season that is around November, NCD vaccine (Lasota) could be administered just before the onset of this period and during the period in order to curtail this disease. Also, fowl pox vaccination could be carried out to prevent further occurrence of the disease. Anthelmintics could be given before the onset of raining season and during raining season to guard against syngamus trachea infection which is said to occur from the month of June to October.

Housing seems to be a major problem to these farmers and because of lack of confining of these chickens in specific areas, it exposes them to theft, attacks by wild birds such as hawk and external parasites. It will be good if these farmers can construct small poultry houses were

these chickens could be kept and fence the area so that so that they will not roam about long distances which exposes them to a lot of hazards. The purchase of poultry and poultry products from neighboring villages on market days could also be a source of disease exposure to their healthy birds because normally when these birds are bought they are usually mixed with the existing ones.

Lack of access to veterinary services is also a problem to these farmers because they don't know where to report to in the face of disease outbreak. Provision of cheaper veterinary services and access to these services will go a long way in improving poultry farming in the study area.

Finally, there is need for improvement of veterinary services in the rural areas for improved poultry productivity. There is also need for community enlightenment programmes for the farmers on poultry production which will also aid in better poultry production. In conclusion, there was no outbreak of HPAI in all the 20 villages where this survey was carried out neither was there any active case of NCD outbreak during the course of this study. This participatory disease surveillance (PDS) has really provided us with insight on difficulties the rural communities are facing in terms of poultry production.

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