



**Restitution Meeting of GRIPA VI**  
**« FSP Ecologie et épidémiologie de la grippe aviaire dans les pays du Sud »**

# Ethiopia

*6<sup>th</sup> October – 08<sup>th</sup> October 2011*

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**Résumé:**

La présente mission a été effectuée dans le cadre du projet «Ecologie et épidémiologie de la grippe aviaire dans les pays du Sud» visant à étudier les dynamiques des pestes aviaires – influenza aviaire hautement pathogène et maladie de Newcastle – et à renforcer les méthodes de surveillance et de contrôle de plusieurs pays africains. L’Ethiopie, bien qu’indemne de grippe aviaire hautement pathogène due au virus H5N1, est un haut lieu stratégique de surveillance de cette maladie du fait de la présence de nombreux oiseaux migrateurs dans les lacs de la Vallée du rift. L’aviculture villageoise en Ethiopie joue un rôle essentiel dans la réduction de la pauvreté et dans le maintien de la sécurité alimentaire des familles rurales. Ainsi l’introduction et/ou la diffusion de maladies aviaires hautement pathogènes dans un pays comme l’Ethiopie peuvent avoir des conséquences dévastatrices non seulement sur l’industrie de la volaille mais également dans le domaine de la santé publique.

Cette mission avait pour objectif la participation à la restitution finale du projet. La réunion a été organisée au NAHDIC à Sébata et s’est déroulée sur 2 jours et demi. Le premier jour un atelier de formation sur les réseaux d’épidémio surveillance et sur les nouvelles techniques de surveillance en santé animale a été proposé à une trentaine de participants constitués en partie de vétérinaires de province et des techniciens du laboratoire de diagnostic. Puis les acteurs principaux du projets ont présentés les résultats du projet en Ethiopie, les autres observatoires ainsi que les questions des futures collaborations entre l’Ethiopie et le CIRAD. 38 personnes ont participé à cette restitution, provenant du Ministère de l’Agriculture, de la FAO, de l’USAID, du Ministère de la faune sauvage, du laboratoire de diagnostic vétérinaire NAHDIC, de la faculté vétérinaire, des bureaux de l’agriculture des provinces, du CIRAD ainsi qu’un représentant de l’ambassade de France en Ethiopie.

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**Type of mission:** Project closure  
**Date and place of publication:** November 2011, Montpellier  
**Countries affected:** Ethiopia,  
**Key words** Ethiopia, HPAI, GRIPAVI, NCD

**Summary:**

This mission was realised within the frame of the project ‘Ecology and Epidemiology of Avian Influenza in Southern Countries’ which aims at studying the dynamics of avian diseases – Highly Pathogenic Avian Influenza and Newcastle disease - and strengthening the surveillance methods and the control strategies of several African countries. Although Ethiopia is free from HPAI H5N1, it represents a strategically important surveillance site for this disease, as it encompasses the Rift Valley lakes where lot of migratory birds is nesting during winter time. Poultry farming in Ethiopia of traditional low input systems which play an important part in the poverty reduction and food safety of rural families. Thus the introduction and/or the dissemination of highly pathogenic diseases in a country as Ethiopia could have devastating consequences not only on poultry industry but also on the field of the hunger relief and public health.

The main mission objective was to participation in the final restitution of the project. The meeting was held in the NAHDIC at Sebata and took place during 2 and half days. The first day a training workshop on epidemiological surveillance networks and the new techniques of animal health monitoring was proposed to 30 participants consisting of veterinary diagnostic laboratory technicians and provincial vets. Then the main actors of the project presented the results of the project specifically for Ethiopia, other observatories and the issues of future collaborations between Ethiopia and CIRAD. The meeting brought together 37 participants from the Ministry of Agriculture, FAO, USAID, the Department of wildlife, the laboratory of veterinary diagnostic NAHDIC, the Veterinary Faculty, the provincial offices, CIRAD and a representative of the Embassy of France in Ethiopia.

## Acronyms

CVO: Chief Veterinary Officer

FAO: Food and Agriculture Organisation

FVM : Faculty of Veterinary Medicine (Debre Zeit)

HPAI: Highly Pathogenic Avian Influenza

ILRI: International Livestock Research Institute

MoARD: Ministry of Agriculture and Rural Development

NAHDIC: National Animal Health and Disease Investigation Centre

NCD: Newcastle Disease

NVI: National Veterinary Institute

SNA: Social Network Analysis

USAID: United States Agency for International Development

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### Schedule:

#### **05/11/10: Arrival at Addis Ababa**

#### **06/11/10: Addis Ababa – Sebata**

- Departure for Sebata
- Meeting with Dr M. Shale (NAHDIC)
- Meeting with Dr M. Balcha (NAHDIC)
- Meeting with Dr H. Chaka (NAHDIC – PhD CIRAD)
- **Training Workshop on Surveillance**

#### **07/11/10: Addis Ababa - Sebata**

- Departure for Sebata
- **Restitution meeting**

#### **08/11/10: Addis Ababa - Sebata**

- Departure for Sebata
- **Restitution meeting**
- Lunch with the participants
- Departure for Bangkok

## Detailed report on the mission

### 1. Training workshop - Sebata

A one-day training on basic epidemiology and surveillance has been organized the day before the workshop. The training gathered 30 participants from veterinary diagnostic laboratory (NAHDIC), provincial veterinarians, students from the veterinary faculty and 2 representants from the wildlife department. The objectives of the training was to give an overview of the most important steps in animal diseases surveillance : basic organisation, importance of case-definition, standardization, flow of information, and evaluation of surveillance systems. And to present new techniques developed in surveillance as Risk-based surveillance, syndromic surveillance... The lectures and the group activities were led by Dr Melesse Balcha, Dr Getachew Gari and Dr Hassen Chaka (NAHDIC) and Dr Flavie Goutard (CIRAD).

Table 1: Schedule

Date	Time	Subject	Responsible		Remark
6 Oct 11	8:30-9:00	Arrival and registration	Abera Kebede		
	09:00-09:15	Welcome Address & self Introduction	Getnet Abe		
	09:15-10:15	Principles of Surveillance of Animal diseases	Hassen Chaka Flavie Goutard		
	10:15-10:45	Tea break	NAHDIC		
	10:45- 11:15	Overview of Risk Based and Syndrome Surveillance	Melesse Balcha		
	11:15- 11:45	Introduction on Risk Assessment	Getachew Gari		
	11:45-12:30	Principles of Risk Based Surveillance	Flavie Goutard		
	12:30 -2:00	Lunch	NAHDIC		
	2:00-3:15	Work group	Flavie Goutard Hassen Chaka		
	3:15-4:45	Work group restitution			

The lectures have been filled up with two working group activities during which participants have been led to design a protocol surveillance for exotic diseases as H5N1, Rift Valley Fever and Equine encephalomyelitis focusing on:

- The objectives of the surveillance programme
- The design of a case definition based on available diagnostic procedures
- The sensitivity and specificity of the diagnostic tests available
- Sampling of target population, timing
- Implementation and coordination (role of actors)
- Explain how the results will be communicated to different stakeholders.
- What will happen with a positive result?
- Feedback

Oral presentations by participants were carried out after the work organised in 3 groups.

## 2. Final restitution of GRIPAVI

### 2.1. Schedule and participants

- The meeting was held in the veterinary diagnostic laboratory (NAHDIC) at Sebata between the 7<sup>th</sup> and the 8<sup>th</sup> of October 2011, and brought together 37 persons from several national and international organizations. The origins of the participants can be found in the table below:

Ser. N <sup>o</sup>	Institutions	Number of Participants
1	French Embassy	1 participant – Dr F. M. De Lahaye
2	APHRD:	CVO and Epidemiology section (3 participants)
3	FAO	3 Participants
4	SPS-LMM:	2 participants
5	USAID	1 participant
6	Wild life Conservation Authority	2 participants
7	Addis Ababa University	2 (student and instructor)
8	Haromaya University	2 (student and Instructor)
9	Oromiya Livestock Agency	3 (1 regional and 2 field vets)
10	EHNIR	2
11	SNNP Agriculture Bureau	3 (2 from field)
12	NVI	1
13	NAHDIC	10
14	CIRAD	2
	<b>TOTAL participants</b>	<b>37</b>

### 2.2. Contents

- The first part of the meeting was dedicated to the presentation of the participants, the presentation of the GRIPAVI project in general and in Ethiopia,.
- Then scientific presentations on the main results achieved in Ethiopia since the start of the project were presented under different sessions with every time several questions and lively discussions.
  - Assessment of Major infectious diseases in backyard poultry production of Ethiopia - Dr H. Chaka:  
Summary:  
This study was conducted to estimate the seroprevalence of Newcastle disease (ND), *Pasteurella multocida* (PM) infection, *Mycoplasma gallisepticum* (MG) infection and infectious bursal disease (IBD), and to assess the level of concurrent seropositivity during the dry and wet seasons of the year 2010. A total of 234 and 216 sera were collected during the dry and wet seasons respectively from unvaccinated backyard chickens at four live poultry markets in two Woredas (Districts) of Eastern Shoa Zone, Ethiopia, and were tested using commercial enzyme-linked immunosorbent assay (ELISA) kits. The overall seroprevalence of



ND, PM, MG and IBD was 5.9%, 66.2%, 57.7% and 91.9% respectively during the dry season, and 6.0%, 63.4%, 78.7% and 96.3% respectively during the wet season. The seroprevalence of MG was significantly higher ( $P < 0.001$ ) during the wet season than during the dry season and significantly higher ( $P = 0.002$ ) in Adami-Tulu-Jido-Kombolcha (ATJK) Woreda (74%) than in Ada'a Woreda (60%). Area and season had no significant effect on the seroprevalence of ND, IBD and PM, indicating the widespread presence of those pathogens throughout the year in the study area. Of all the chickens tested, 85.6% had antibodies concurrently to more than one of the pathogens investigated. Birds were concurrently seropositive to more diseases during the wet season (median = 3) than during the dry season (median = 2) ( $P = 0.002$ ). As serology is not able to distinguish between strains, further studies are warranted to better understand the circulating strains, their interactions and their economic effect on backyard poultry production in Ethiopia.

**H. Chaka, F. Goutard, S. P. R. Bisschop, P. N. Thompson. Seroprevalence of Newcastle disease and other infectious diseases in backyard chickens at markets in Eastern Shoa Zone, Ethiopia. Poultry Sciences, Submitted Sept 2011.**

- Market Social Network Analysis – Dr Goutard

Summary:

Live bird markets and contacts between them through poultry traders are known risk factors in the spread of diseases such as Newcastle disease. The use of 29 shared markets during and outside festive seasons in the Oromia region of Ethiopia was explored by means of a traders' questionnaire survey. The networks of chicken movements were built and described and centrality indexes (in-degree, out-degree, in-closeness, out-closeness and random-walk betweenness) were used to build a typology that was compared with one using descriptive characteristics of the markets (number of chickens, number and type of sellers and frequency). The festive seasons did not appear to have an impact on the network structure, implying no necessary change of surveillance and control policies during these periods. Three markets, Meki, Debre Zeit and Adulala, emerged from the typology based on in-degree, out-degree, in-closeness, out-closeness and random-walk betweenness, as central in the network, which would not have been deduced from their descriptive characteristics alone. Our findings indicate that these three poultry markets would ideally be chosen in a surveillance system such like risk-based and in targeted control policies.

**E. Vallée, A. Waret-Szkuta, H. Chaka, R. Duboz, M. Balcha, F. Goutard. Analysis of poultry trader networks in Oromia Regional State, Ethiopia. Vet Journal, Submitted 2010.**

- Role of wild birds on the epidemiology of NDV: study on the lake Arekit – Dr Melesse

Main findings:

PPMV1: All isolates within the three consecutive years when sequenced at the cleavage sites, a cleavage site motif of RRRKRF revealed all were Virulent. These virus falls into lineage 4 (4b), the lineage that includes viruses related to the ongoing panzootic in pigeons. The isolates in the different years were related to each other more than 99% indicating that there is circulation of the virus between the lake and backyard poultry

•PMV1 (Newcastle Disease): Strain was isolated from the Lake in 2009 but not yet from the backyard because of lack of intensive follow up. Sequencing at the cleavage site of isolate has been completed and a cleavage site motif of RRQKRF (Virulent). This isolate also falls into lineage 4 and is most closely related to lineage 4a. Phylogenetic analysis shows it has 91.7% to an isolate from Turkey 1995 and 91.4% with isolates from Israel in 2001 and 2005.

- Seroepidemiological study and detection of NDV in backyard poultry production production in Ethiopia – Dr Chaka

Main findings:

Individual animal ND antibodies in backyard chickens was generally low ( 6%) but higher at household level(17-27%) mainly velogenic ND virus that results in very high mortality.

Odds of seropositivity was twice during the dry season compared to the wet season. Virus circulation seems to be intensified when flock antibodies decline, susceptible population increase and there are practice of taking sick or incubating chicken to market. There is little variation observed between Woredas in the prevalence of ND in this study, suggesting the wide spread prevalence of the diseases in backyard chickens but epidemiology and ecology varies from area to area.

DNA amplification showed the majority (73%)of strain circulating were velogenic NDV strains of genotype VIIb and VI (PPMV) and the phylogeny showed that the pathotype and genotype of the virus strains detected both at village and markets put in a similar/closer cluster.

**Paper under preparation**

- Surveillance and Diagnosis of HPAI & Highly Pathogenic Poultry Diseases (HPPD) in Ethiopia - Dr Melesse

More than 17, 206 samples have been collected and tested so far and different causal agents other than HPAI have been detected and isolated:

- LPAI H8N4 from waterfowls in 2006

- NDV isolates from different sites between 2007 and 2009

- PPMV1 from 6 different sites between 2006 and 2009 from doves

- in 2009 isolation of PMV1 & PPMV1 from chicken in market and from other site from fecal dropping in a village near a lake

- PMV3 & Herpes from transit parrots in airport in 2008

- IBD of 91.4% seroprevalence from live bird at market in Addis Ababa

NAHDIC is the referral lab of 12 countries in East Africa

In future, 12 tests for 5 diseases are to be accredited for ISO 17025 then the Center will be the 3rd African veterinary laboratory with accreditation.

- Animal disease handling practices and poultry intensification : Poultry farmers in Ethiopia – Dr Goutard

**Paper under preparation**

- The meeting ended with presentation of the main results achieved by the project in the other observatories done by Dr Roger. Then a presentation was done by Dr Mesfin, director of the NAHDIC to summarised the main outputs in term of training by the project

for the laboratory and to discuss about the future of the collaboration between the NAHDIC and the CIRAD:

1- HPAI & ND molecular diagnosis, Ethiopia, April 19-27 2007, by Patricia Gil – Emmanuel Albina

Objectives:

- Training in molecular diagnosis of AI and ND
- Knowledge on different protocols and procedures to be used both for conventional and real time PCR.
- Information on molecular typing and Phylogenetic analysis of AIV and NDV
- 5 staff trained

2- Hands on training on Bird Capture Bird Identification and Sampling held 8-15 December 2010 around lakes of Debrezeit and bush lands of Awash National Park.

- The training needed capture and sample collection from passerines and water birds (ducks, geese, waders, herons)
- By Ornithologists from CIRAD, France.
- Trainees were: 2 staff of EWCA plus 2 in the park, 3 staff of NAHDIC

3- Findings of the research activities conducted by scholars of both countries (disease control strategies and policy). Human capacity building (training of a PhD candidate and other laboratory personnel on disease risk assessment , modeling and modern diagnostic and epidemiological techniques). Provision of proficiency tests on molecular techniques to support competency of NAHDIC.

**Future collaboration:**

Capacity building for the adoption of modern and future technologies of detection, identification, monitoring of animal health problems

Surveillance and related research will also be vital in delivering sustainable and effective solution to manage future risks

## GRIPAVI Workshop Schedule

Date	Time	Subject	Responsible	Remark
7 Oct 11	8:45-9:15	Arrival and registration	Abera Kebede	NAHDIC
	09:15-09:45	Welcome Address & self Introduction	Dr. Mesfin Sahle	NAHDIC
	09:45-10:00	Remarks from Dr. Francois Marie LAHAYE	Dr. Francois Marie Lahaye	French Embassy Eth.
	10:00-10:15	Remarks from CIRAD/GRIPAVI project	Dr François Roger	CIRAD
	10:15- 10:35	Briefing on GRIPAVI Project	Dr. Flavie Goutard	
	10:30-11:00	Tea break	NAHDIC	
	11:00-11:40	Assessment of Major infectious diseases in backyard poultry production of Ethiopia	Hassen Chaka	Prof Getachew Abebe chair FAO
	11:40-12:20	Market Social Network Analysis	Dr Flavie Goutard	
	12:20-1:00	Role of wild birds on the epidemiology of NDV and Laboratory Analysis NAHDIC	Melesse Balcha	
	1:00 -2:00	Lunch		
	2:00-2:40	Sero-epidemiological andmolecular study of NDV in backyard poultry, Ethiopia	Hassen Chaka	
	2:40-3:30	Risk perception by farmers on poultry diseases	Dr Flavie Goutard	
	3:30- 4:10	Tea break & poster presentations		
	4:10-5:30	Discussion on the implications of findings Input to policy marker / surveillance General discussion Future collaboration / project	Trainer & Participants	Dr. Wendwosen USAID
8 Oct 11	09:00-09:30	Surveillance of HPAI and HPPD in Ethiopia and major Achievements	Melesse Mesfin	Dr Gari NAHDIC
	09:30-10:00	GRIPAVI Findings from other countries	Dr. François Roger	
	10:00-10:30	Collaborations between CIRAD and NAHDIC with implications for the future	Mesfin Sahle	
	10:30-11:15	Summary of discussion	Dr Hassen Chaka	
	11:15-11:30	Closing Remarks	Dr. Mesfin	
	11:45-2:00	Lunch Alem Hotel Alemgena	NAHDIC	