



NATIONAL PROGRAM FOR THE PREVENTION AND FIGHT AGAINST EMERGING AND RE- EMERGING ZOOSES



The National Program for the Prevention and Fight against Emerging and Re-Emerging zoonoses (NPPFERZ) has been elaborated thanks to financial and technical support of USAID-EPT-RESPOND Project.

However, opinions expressed in this document do not necessarily represent the points of view of USAID or that of the Government of the United State of America.

PREFACE

Emerging and re-emerging infectious diseases diagnosed across the globe during the past ten years and above have been overwhelmingly (75%) zoonotic i.e. diseases transmissible from animals to man and vice versa. For example between 2004 through 2012 several emerging or re-emerging zoonotic diseases such as Anthrax, Highly Pathogenic Avian Influenza (HPAI) H5N1, Pandemic Flu (A-H1N1-2009), Rabies and Tuberculosis have been diagnosed in Cameroon.

The Government of Cameroon, conscious of the potential negative impacts of such diseases on animal, human and environmental health, food security as well as on the socio-economic advancement of the country, by Prime Ministerial Act N°070/PM of 28th April 2008, put in place an ad hoc committee charged with the elaboration of the National Program for the Prevention and fight against Emerging and Re-Emerging Zoonoses (NPPFERZ).

Under the auspices of the Minister of Livestock Fisheries and Animal Industry (MINEPIA), in collaboration with experts from other Ministerial Departments namely; Forestry / Wildlife, Environment, Public Health, Scientific Research, Agriculture, Tourism, Territorial Administration / De – centralization, Economy, Plan / Regional Development, Finance, Communication, Higher Education, technical and financial support from RESPOND – USAID, other stakeholders , the guidance of two consultants and by a multi-disciplinary / multi-sector approach the ad hoc committee was charged with the elaboration of the Program.

On this basis and following working field visits to sites within the nation where these diseases have been reported, proposals on how to efficiently and effectively prevent and fight emerging and re-emerging zoonotic diseases in the country were tabled for evaluation, amendment, adoption and validation.

With the “one health approach” as harbinger, national stakeholders working in synergy with competent experts from International organizations had to ensure that the development, realization or implementation of validated instruments or solutions are in the letter and spirit of this approach.

Consequently team work in a multi-sectoral, inter-disciplinary manner is the way forward in the surveillance, prevention and fight against these diseases. In other words, it takes into account a holistic and transversal vision that integrates stakeholders of animal, human and environmental health.

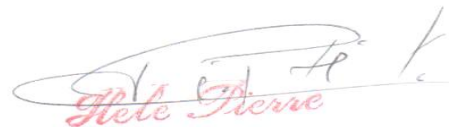
We hereby invite all stakeholders involved in this endeavor to and with a spirit of determined collaboration, wholeheartedly engage in resolving this gruesome problem

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ACRONYMS AND ABBREVIATIONS

APE	Pre execution project
BAD	African development bank
BEAC	Bank of central african states
BEC	Cameroon epidemiology bulletin
BIP	Public investment budget
BISI	Health information and computing bureau
BM	World bank
CENAD	Cameroon epidemio-surveillance network for animal diseases
CNLS	National committee for the fight against aids
CPC	Pasteur institute cameroon
CPS	Chief of surveillance post
DAOAOH	Food of animal and halieutic origin
DCTD	Directorate of Decentralize Territorial Units
DEP	Directorate of Studies and Projects
DLM	Directorate for the fight against disease
DRPIA	Regional delegation of livestock fisheries and animal industries
DSV	Directorate of veterinary services
ECAM	Cameroon Household Surveys
EDS	Health and Demographic Survey
EPT	Emerging Pandemic Threats
ESMV	School of Veterinary Sciences and Medicine
FMD	Foot and Mouth Disease
FAO	Food and Agricultural Organization
FASA	Faculty of Agronomy and Agricultural Sciences
FFOM	Strengths, Weaknesses, Opportunities and Threats
FMSB	Faculty of Medicine and Biomedical Science
RVF	Rift Valley Fever
H5N1	Highly Pathogenic Avian Influenza H5N1
GIC	COMMON INITIATIVE GROUP
GIZ	German Cooperation
HOP	Hospital
GVFI	Global Viral Forecasting Initiative

IPAVIC	Poultry Inter-Professional Association of Cameroon
ISV	Veterinary Sanitary Inspection
LANAVET	National Veterinary laboratory
LEID	Laboratory for Emerging Infectious Diseases
MAPE	Disease with Epidemic Potentials
PED	Vaccination Evitable Disease
MINATD	Ministry of Territorial Administration and Decentralization
MNINCOM	Ministry of Communication
MINDEF	Ministry of Defense
MINEPDED	Ministry of Environment, Nature Protection and Sustainable Development
MINEPIA	Ministry of Livestock, Fisheries and Animal Industries
MINES	Ministry of Higher Education
MINFOF	Ministry of Forestry and Wildlife
MINRESI	Ministry of Scientific Research and Innovation
MINSANTE	Ministry of Public Health
MINTOUR	Ministry of Tourism
MNC	Newcastle Disease
MRLC	Legally Reputed Contagious Disease
MSEG	Special Mission for the Eradication of Glossina
OCEAC	Coordination Organization for the Fight against Endemic Diseases in Central Africa
WHO	World Health Organization
WHO/AFRO	WHO for Africa
NGO	Non Governmental Organization
ONG/NGO	Organization Non Governmental / Non Governmental Organization
ONMC	National Order of Medical Doctors of Cameroon
ONPC	National Order of Cameroonian Pharmacist
ONVC	National Order of Veterinary Doctors of Cameroon

PACA	Project for Ameliorating Agricultural Competitiveness
PACE	Pan African Program for the Control of Epizootics
PADAV	Project for the Develop of Village Poultry
PDFP	Swine Development Project
PEV	Enlarged Vaccination Program
PFC	Common Fund Project
PNIPLGA	National Integrated Program for the Prevention and Fight against Bird Flu
UNDP	United Nation Development Program
PNVRA	National Agricultural Extension and Research Program
ASF	African swine fever
CBPP	Contagious Bovine Pleuri -Pneumonia
PPE	Personnel Protective Equipment
PPR	Pest des Petits Ruminants
PTF	Technical and Financial Partner
RES	Epidemio-Surveillance Network
RSE	Monitoring and Evaluation Officer
RSI	International Sanitary Regulation
S&E	Monitoring and Evaluation
SFV	Simian Foamy Virus
SIMR	Integrated Disease Surveillance and Control
SIV	Simian Immune deficiency Virus
SNV	Netherlands Development Organization
SPM	Specialist in Awarding Contracts
SRPSSPV	Regional Service for Animal Health and Veterinary Public Health
STLV	Simian T cell Lymphotropic Virus
ICT	Information and Communication Technology
AU-IBAR	African Union-Inter- African Bureau for Animal Resources

UB	University of BUEA
UM	University of Montagnes
EU	European Union
IUCN	International Union for the Conservation of Nature
OUT	Operational Technical Unit
HIV	Human Immune deficiency Virus
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund
CZI	Cynegetic Zone OF Interest
CMCI	Community Managed Cynegetic Interest

EXECUTIVE SUMMARY

This document containing the *National Program for the Prevention and Fight against Emerging and Re-emerging Zoonoses (NPPFZRZ)* in Cameroon, is the fruit of a committee created by the Prime Minister, Head of Government through Act N°070/PM of 28th April 2008. It is the outcome of a participatory, multi-disciplinary, inter-sectoral and consensual process. Zoonotic diseases through their direct and indirect impact on health and resources are serious threats to the wellbeing of humans, animals (domestic and wild) and their environment.

Our craving for bush-meat resulting in activities such as hunting, handling and marshalling of bush-meat or destruction of ecosystems, bridges the interfaces between human (especially rural) domestic animal and wildlife consequently exposing these populations to a plethora of infectious microorganisms.

Outbreaks of emerging or re-emerging zoonotic diseases such Ebola and Marburg hemorrhagic fevers, Rift Valley Fever, Anthrax; in epizootic or endemic proportions have been reported in some of our neighboring countries. Mortalities of non-human primates and other wild mammals registered during the last few years in Cameroon, is proof of the existence and circulation of these pathogenic agents in our sub-region further justifying the need for a proactive and efficient program against emerging and re-emerging zoonoses.

Appreciation as well as in-depth assessment of the surveillance systems of animal and human diseases in the country brings out the following findings;

- ☞ The presence of zoonotic diseases within all the agro-ecological zones; evident by the existence of a multitude of risk factors notably risky attitudes like poaching, uncontrolled grazing of livestock in National Parks.
- ☞ Inadequacies in the epidemio-surveillance systems in both the human and animal health sectors especially as concerns personnel training, laboratory equipment and infrastructure, information flow and the non-existence of an inter-sectoral sanitary watchdog team.
- ☞ Training curricula at all levels is yet to place required, particular attention on zoonoses as well as faithfully embrace the “One Health” approach.
- ☞ Research on zoonoses by universities, laboratories and research institutions is done in an uncoordinated manner and without the support of the Cameroonian private sector. Such research however, benefits from foreign partnership even though rarely taking national priorities into account.
- ☞ Institutional frameworks even though rich in regulatory texts are yet to embrace and facilitate multi-sectoral and multi-disciplinary collaboration within the context of the “One Health” approach in the prevention and fight against zoonotic diseases.

This Program aims to fill these and other gaps in terms of prevention and fight against emerging and re-emerging zoonoses, by reinforcing epidemio-surveillance, disease control /eradication systems as well as markedly enhancing the operational and functional capacities of all stakeholders at all levels, by using appropriate and adequate training and research methods on zoonotic diseases in accordance with the “one health” approach. Appropriate regulatory framework based on present and future exigencies anchored on multi-sectoral and interdisciplinary synergies are the galvanizers.

Being the fruit of a national consensus grouping the human, animal (domestic and wild) and environmental health sectors, this NPPFERZ Program is the answer to the threats of zoonotic challenges. It justifies the need for our being proactive in planning and actions hence the reinforcement of epidemiological surveillance networks in Cameroon with regards to the control of emerging and re-emerging zoonoses thus markedly increasing the competitiveness of Cameroon and her resources thanks to heightened vigilance / freedom from infectious zoonotic diseases

The NPPFERZ Program is in consonance with the National Strategic Document (DSCE) for Growth and Employment in Cameroon. As concerns the health domain, it is worth reiterating that the Government insists on improving the health of populations through a holistic approach which lends priority to systemic research that garners and strengthens inter-sectoral synergies enabling the successful implementation of strategic policies concerning the health sector. Specifically, it ties with the national strategy of promoting the “One Health” approach.

In this light, the NPPFERZ hopes to make Cameroon an international reference in the prevention and fight against emerging and re-emerging zoonotic diseases in the immediate, medium and long terms

Consequently, its objectives are :

- (1) To promote the “One Health” approach as an instrument of the “One Health” National Strategy;
- (2) To reinforce collaboration between national services responsible for animal health (domestic and wildlife), human health and environmental health so as to ameliorate the surveillance, investigation and control of zoonoses;
- (3) To master the major risks or sources of contamination of humans as concerns emerging or re-emerging zoonotic diseases from domestic or wild animals;
- (4) To improve and reinforce the quality of services offered in a bid to fight off zoonoses through training and strengthening of the skills of national stakeholders at all levels;
- (5) To promote scientific research in matters concerning zoonoses.

To attain these objectives the program has three main components namely;

- ☞ Reinforcement of epidemiological surveillance, investigation, prevention and control of emerging and re-emerging zoonoses;
- ☞ Reinforcement of fundamental and operational research on zoonoses;
- ☞ Reinforcement of training on the prevention and fight against emerging and re-emerging zoonoses.

Institutionally, NPPFERZ is organized around three principal organs namely;

- ☞ The Pilot Committee;
- ☞ The Technical Orientation Committee;
- ☞ The National Coordination.

☞ **The Pilot Committee**

Chaired by the Prime Minister, Head of Government; this organ is responsible for policy orientation especially the promotion of the “One Health” National Strategy and has as members

the ministers of the nine Ministerial Departments whose activities are directly linked with those of the Technical and Financial Partners of the Program;

👉 **The Technical Orientation Committee**

This is the technical orientation organ of the program and it is composed of;

- 👉 09 Technical Directors drawn from all the Ministerial Departments concerned;
- 👉 03 representatives of professional orders (Veterinarians, Pharmacists and Medical Doctors) ;
- 👉 01 representative from the civil society;
- 👉 01 representative from the association of hunters' guide.

The Technical Orientation Committee is assisted by a Scientific Commission co-presided by representatives of MINRESI and MINESUP and to which are added representatives of MINEPIA, MINSANTE, MINFOF and MINEPPED. It is a consultative organ charged with putting a technical touch on the working projects of the Program.

The Technical Orientation Committee is presided over by one of its members designated by the Pilot Committee from among the representatives of the four strategic Ministerial Departments (MINEPIA, MINSANTE, MINRESI and MINFOF) through one of the following three options:

- 👉 a rotating presidency;
- 👉 a co-presidency ;
- 👉 a president with three vice presidents

☞ **The National Coordination**

This is headed by a Permanent Secretary recruited through a job offer announcement. It is the Programming, Coordinating and Executing Organ. This office takes care of all administrative and financial matters; through her monitoring and evaluation services (S &E), she makes sure that all activities are clearly monitored and evaluated.

The coordination model is based on two complementary mechanisms namely an intra - sectoral mechanism and an inter-sectoral mechanism.

Mobilization of necessary resources for financing activities of the program is from two principal sources namely; Public Investment Budget (PIB) and contributions from Technical and Financial partners (TFP). The principle of establishing a “**Common Fund**” into which all financial resources will be lodged was accepted and adopted. The budgetary transactions of NPPFERZ will be in conformity with the financial dispositions of the country.

Key technical actors of NPPFERZ are staff of the Ministerial Departments (MINEPIA, MINSANTE, MINFOF, MINEPDED, MINSUP and MINRESI) directly concerned with its activities besides other stakeholders and the general population.

The first phase of this Program with duration of six years is estimated to cost 13 billion francs CFA. Its takeoff activities include institutional development, the putting in place of its various operational organs or structures, elaboration of its basic texts and the recruitment of personnel.

Capitalizing on experiences gained from “Projet Fonds Commun” against HPAI H5N1, it is hoped that inherent challenges will be easily overcome permitting the successful implementation and realization of the objectives of NPPFERZ.

Key Words: *Emerging and Re-emerging Zoonosis, Prevention, Fight, Multi-sectorial collaboration, “One Health” approach, Cameroon*

I. GENERAL INTRODUCTION

1.1. CONTEXT AND JUSTIFICATION OF PROGRAM

1.1.1 General Context

The Strategic Document for Growth and Employment (DSCE) with regards to health lays emphasis on the search for Inter-sectoral Synergies insisting on health promotion through integrated communication and food security; consequently the NPPFERZ is placed within this context.

Originating from animal reservoir, zoonotic diseases are a major threat to wildlife, domestic animals and humans. Our craving for bush-meat resulting in activities such as hunting, handling and marshalling of bush-meat or destruction of ecosystems, bridges the interfaces between human (especially rural) domestic animal and wildlife, consequently exposing these populations to a plethora of infectious microorganisms. The situation is made worse by the fact that no veterinary sanitary inspection is carried out on bush meat prior to its manipulation for consumption further exposing the general public especially stakeholders like hunters, transporters, cooks etc.

Neighboring countries sharing similar agro-ecological zones with Cameroon have already registered outbreaks of some of these emerging and re-emerging diseases (hemorrhagic fevers due to Ebola and Marburg viruses, Rift Valley Fever, anthrax etc) in epizootic and epidemic proportions.

The death of non human primates as well as other wild mammals registered these last years in nations of our sub-region including Cameroon testify to the presence of pathogenic agents with zoonotic potentials in the midst of wildlife in the sub-region. These mortalities justify the need for a proactive surveillance system that permits the prompt detection of emerging or re-emerging pathogenic agents enabling the rapid putting into place of appropriate control and eradication measures; thus inhibiting the outbreak of these diseases in our animal populations as well as their potential spread to humans.

The absolute need for the prompt detection of emerging and re-emerging pathogens in their reservoirs as well as the prompt institution of appropriate control/eradication measures is critical in veterinary public health.

Besides these emerging and re-emerging disease threats, other livestock disease burdens coupled with limited economic growths are additional constraints to Cameroon's food security as well as export of her livestock resources.

Internationally, even though trades in animal and animal products have been liberalized thanks to World organization of the Trade (WTO) agreements, the marketing of these commodities must be in conformity with Sanitary and Phyto-Sanitary (SPS) measures and in accordance with the Animal World Health Organization (OIE) and the Codex Alimentarius prescriptions. These exigencies necessitates that Member States, signatories to these agreements or protocols respect and apply them in all transparency; hence the need for regular, up to date reporting and publishing of zoo-sanitary situation in their respective territories in time and space.

The prevention and fight against zoonoses reiterates the importance of preserving animal health. Amongst the realizations of MINEPIA in this light and on which we should capitalize are;

- 👉 The Pan-African Program for the Control of Epizootics (PACE) that went operational in 2004, targeting 7 diseases namely; Rinderpest, ASF, PPR, FMD, CBPP, Newcastle

Disease as well as HPAI H5N1 (H5N1 was included in 2006). Thanks to the PACE Program, Cameroon was declared *provisionary* free from Rinderpest in 2008.

- ☞ Enhanced collaboration between MINEPIA and MINFOF thanks to the Wildlife Unit of PACE. Results obtained from analysis of wildlife specimens collected by this Unit were critical in the attainment of Rinderpest free status by Cameroon. This Unit is also associated with the collection of wild duck samples that resulted in the diagnosis of **HPAI H5N1** in the village of MALAPE near Garoua.
- ☞ Suspicion of HPAI H5N1 by the Animal Diseases Surveillance network followed by confirmation by appropriate national and international reference laboratories galvanized collaboration between MINEPIA and MINSANTE leading to the conception and elaboration of the National Contingency Plan against the disease as well as the creation of the “Projet Fonds Commun”. Besides creating a common platform of action for animal and human health providers at all levels, this project facilitated the integration of other stakeholders in health management; hence a multi-disciplinary / multi-sectoral approach to health or the “one health” concept.

The training of MINEPIA and MINFOF staff on the collection of statistics on wildlife is another major realization accredited to the PACE Program. Another important achievement is the legal recognition and provision that authorizes the Ministers of MINEPIA and MINSANTE to through a joint *arête*, adjust the list of zoonotic diseases as need arises. Consequently, in addition to consolidating these gains, it is important their effects be extended across the nation.

1.1.2 Specific context and justification

The dilemma of zoonoses in the framework of this program could be summarized as follows;

⇒ **Globally:**

- ☞ the identification of emerging or re-emerging diseases are not uncommon;
- ☞ 60% of emerging disease are infectious and of these, 75% are zoonotic;
- ☞ 80% of pathogens used in bioterrorism have animals as their reservoir.

Within the context of ecosystem health, these zoonoses are complex and serious challenges to animal, human and environmental health.

⇒ **Congo Basin**

During the last three decades the Congo Basin to which Cameroon ecologically and geographically belongs has witnessed outbreaks of zoonotic diseases in epidemic proportions resulting in mortalities amongst wildlife, domestic animals and human populations.

⇒ **Cameroon**

- ☞ From December 2004 through 2005, the outbreak of Anthrax among big monkeys within the DJA Reserve;
- ☞ In 2006 in the North (DOUALARE and MALAPE) and Far North (VELE) Regions, three outbreaks of HPAI H5N1 in backyard domestic poultry and in unclassified wild

ducks with devastating socio-cultural and economic consequences on the poultry sub-sector as well as on the livelihood of stakeholders.

In the face of the recurrent threats of emerging and re-emerging zoonotic diseases with its attendant health and socio-economic consequences and in the absence of an inter-sectoral health watchdog structure, Cameroon took the resolution to put in place an Ad Hoc Committee charged with the elaboration of a National Program for Prevention and Fight against Emerging and Re-emerging Zoonoses (NPPFERZ) based on the “One Health” approach.

By Prime Ministerial Act N°070 of 28th April 2008, the Inter-Ministerial Committee was created and placed under the auspices of Ministry of Livestock, Fisheries and Animal Industries.

1.1.3. Principal steps of NPPFERZ’s elaboration

The Government of Cameroon, through the RESPOND Project, solicited and obtained from USAID necessary assistance for the Program’s elaboration.

The first step was the recruitment of two consultants by the RESPOND Project. These experts were charged with supporting and guiding the ad hoc committee in the accomplishment of its mission.

This process was officially launched in DJEUGA Palace Hotel, Yaoundé on the 22nd and 23rd of September 2011 through a workshop with theme “ the Promotion of the One Health Approach”, by the Permanent Secretary of the Ministry of Livestock, Fisheries and Animal Industries, in the presence of His Excellency, the Ambassador of the United States of America to Cameroon.

Following the launching, the next step i.e. presentation of the proposed working methodology by consultants, was held on the 20th of October 2011. During this meeting, a Technical Secretariat was created as the operational organ of the committee; and through a participatory approach, its work schedule was established.

In order to come out with the first draft document of the Program, several activities had to be carried out notably:

- ☞ A descriptive investigation on zoonoses and related factors within the five agro-ecological zones of Cameroon, laying particular emphasis on background information and current situation , in relation to surveillance and control activities by actors of the public and private sectors;
- ☞ The holding in Yaoundé, of several working sessions of the Technical Secretariat;
- ☞ The holding of two conception workshops to examine the draft program document in Yaoundé from the 13 through 16 December 2011 at DjJEUGA Palace Hotel, and in Kribi from 11 through 13 January 2012 at “Residence July hotel”.
- ☞ The holding at Hotel Mont FEBE Yaoundé from the 6 through 7 February, 2012 of a pre-validation workshop on the draft document; this workshop was presided by H.E. the Minister for Livestock, Fisheries and Animal Industries.
- ☞ The holding of a validation workshop presided by the Minister of Livestock, Fisheries and Animal Industries, in the presence of the Minister of Environment, Nature Protection and Sustainable Development as well as the representatives of the Minister of Public Health, of Wildlife, of Higher Education and the representative of the United States Ambassador to Cameroon.

The present Program Document, fruit of a participative, multi-disciplinary, inter-sectoral and consensual endeavor is the appropriate response to the threat of zoonotic risks and justifies the absolute need to reinforce epidemiological surveillance networks in the sectors of animal, human and environmental health for the control of emerging and re-emerging zoonotic diseases in Cameroon. In this perspective, it shows the willingness of Cameroon to increasingly modernize itself thanks to the protection of its citizens and resources, thus enhancing its international competitiveness and ranking.

1.2. AN OVERVIEW OF CAMEROON: SOME INDICATORS

Cameroon is a country in Central Africa, within the Gulf of Guinea, between latitudes 2° and 13° North and longitudes 9° and 13° East. Triangularly shaped, the country has a surface area of 475 650km² that extends from the south to Lake Chad covering a distance of over 1200km. stretching from west to east, its base extends to over 800km. She has a maritime boarder to the south west of 420 km along the Atlantic Ocean. To the west she shares boundary with Nigeria; to the south with Congo, Gabon and Equatorial Guinea; to the east with Central African Republic and to the north with Chad. Lastly, at the end of the northern triangle she is crowned by Lake Chad. Her official languages are French and English.

1.2.1. Administrative divisions

Administratively, the Republic of Cameroon is divided into ten (10) Regions, fifty-eight (58) Divisions and three hundred and sixty (360) Sub Divisions. The administrative boundaries of subdivisions make up municipalities with the exception of specially designed Territorially Decentralized areas called Urban Councils. At the base of this administrative set up are found traditional chieftains.

1.2.2. The natural environment

➤ Agro-ecologic zones

Cameroon is generally classified as Africa in miniature because of her geographical diversity. Studies carried out by the National Program for Environmental Management (NPEM) in 1996, identified five major agro-ecological zones namely;

(1) *The Sudano-Sahelien zone(dry savanna, humid savanna, sahel, desert, mountain zone1)*

This area is found between latitude 8° and 13° North and is made up of the Mandara Mountain, the planes of the Far North and the Benue Valley. This zone which stretches over 102,680km² has an annual rainfall of 400-900mm; mostly during the four months of July through October. Average temperatures are around 28 ° C with significant variation (average annual thermal fluctuation is 7.7 °C). The soils are generally sandy to clayish or halomorphic.

(2) *The High Guinea Savanna Zone (Humid savanna, dry savanna, flooded zone) (zone 2)*

This is found between latitude 4° and 8° North covering an area of over 130,000km². It is made up of the savanna of the Adamawa Plateau, the low savanna of the Centre and East Region and the Tikar plains. It has a humid tropical climate with a biannual rainfall pattern in the low savanna of the Centre and East Regions and an annual rainfall pattern in the rest of the zone. Annual rainfall is between 1200-1600mm.

(3) **The Western High Plateau Zone (humid savanna , mountainous zone, flooded zone) (zone 3)**

This is situated between latitude 5° and 8° North and covers the high plateau of the West and North West Regions of Cameroon.

The natural environment is favorable thanks to the mountainous climate and fertile volcanic soils which explains her very high population density of about 114 inhabitants per km².

(4) **Forest Zone with Bi-modal Rainfall (forest mountainous zone, flooded zone and coastal zone).**

This ecological area spreads between latitude 2° and 4° North and is made up of the deforested areas of the Centre and Littoral Regions as well as the dense humid forest of the South and East regions. It covers an area of 181,681.5km². The climate is equatorial with two rainy seasons and a rainfall range of 1500 to 2000mm. Average annual temperature is 25°C with amplitude of 2.5°C. This climate permits two farming seasons for a variety of crops by virtue of the prevailing high humidity throughout the year. The average population density is 42,7inhabitants/km².

(5) **Forest Zone with mono-modal Rainfall (forest mountainous zone, flooded zone and coastal zone). (zone 5)**

It covers the maritime coastal area located at the bottom of the gulf of Guinea. It covers an area of 9, 671, 3 Km² and is characterized by a significant human concentration. The development of the industrial activities, agricultural, harbour and oil made a zone of significant immigration of it. The average population density is there of 132,6 inhabitants in Km².

➤ **Hydrography**

There are three zones or sources of water; endoric source characterized by water flowing into the continent, exoric source characterized by the movement of water into the sea and aeric flow characterized with water stagnation.

It is worth noting that most rivers in the country originate either from the ADAMAWA or South Plateaus. These water sources or ways are grouped into four basins namely;

☞ **The Atlantic Basin:** this is the most important basin with three groups of rivers that descend dorsally emptying into the Atlantic Ocean. These are;

- The West Coast Rivers namely ; River Mungo, River Wouri (also called River Nkam in its upper parts after Yabassi), River Manyu (also called Cross River as it enters into Nigeria) and River Dibambamn.
- River Sanaga¹ (920km in length);
- The South Coast Rivers²

☞ **The Congo Basin**

¹ Most important river in Cameroon; draining an area of about 140,000 km². Its main tributaries are MBAM, NOUN and KIM. From EDEA to the Atlantic Ocean, the Sanaga is navigable. About 55,000,000,000 kwh of electricity can be generated from her

² Rivers here originate from the south plateau; note worthy is the NYONG that sources from the east of ABONG BANG. It drains a basin of about 29,000km². There are also rivers KENKE, LOBE and NTEM (the TEM is from Gabon) that empties into the ocean by four tributaries

In this Basin and originating from the Adamawa Plateau are River Kadei and River Ngoko.

👉 **The Niger Basin**

In this Basin we have River Benue (1400km long); its tributaries River Faro and River Deo collect waters of the Adamawa, Mandara and Atlantica highlands.

👉 **The Tchad Basin**

This is the least important Basin; River Logone with River Vina as its principal tributary is the only river.

👉 **Volcanic lakes :** these include; Lake Tison, Lake Oku and Lake Nyos; tectonic lakes such as Lake Ossa, Lake Dissouni, Lake Ejagham etc are located within volcanic craters.

👉 **Receding lakes :** one example is Lake Chad because a small part is for Cameroon

👉 **Artificial lakes :** These are water catchments for the production of hydroelectricity; examples are Songloulou, Lagdo ,Mbakau

➤ **Physical features**

Cameroon has numerous physical features notably its 402km of coastline, considerable hydroelectricity potential, fertile soils, diverse agricultural activities and potentials as well as substantial mineral resources. She also has dotted natural and protected parks some of which are classified under world heritage sites. These protected parks such as the Dja Reserve have huge cultural heritage that are yet to be exploited or potentiated. In fact Cameroon`s forest and biodiversity represent an important part of the riches of the Congo Basin which only compare with the Amazon Basin. The forest which occupies 22.7 million hectares (occupying 55% of the national territory) of which 17.5 million hectares are exploitable is characterized by a big diversity of flora and fauna. There are 13 national parks, 12 fauna reserves and two fauna sanctuaries covering an area of 4,452,512 hectares. The country has various important cynegetic zones of which 27 are found in the North and Adamawa Regions, 18 in the East Region and 10 community managed cynegetic zones (ZIOGC) The biological diversity is made up of 400,000 mammalian species, 800 bird species, 300 amphibian species, 180 reptile species, 1000 butterfly species etc.

1.2.3. Human Resources

👉 **Demography**

The demographic dispositions of Cameroon are positive and dynamic with the average number of children per woman being above 5.

With an annual population growth rate of 2.6%, the human population of the country is estimated at 19,406,100 (BUCREP, 2005). The population density varies from 7.4 inhabitants /km² in the East Region to 141.5 inhabitants /km² in the Littoral Region. With the current population growth rate, it is projected that the human population will double in 25 years. Females and males respectively constitute 50.5% and 49.5% of the population and of these, 50% is below 25 years of age with an overwhelming majority being below 14 years (BUCREP, 2005). Consequently, Cameroon essentially has a youthful population of which 52% live in urban areas.

👉 **The People**

Cameroon has a heterogeneous population constituted of 250 ethnic groups.

1.2.4. Health

Improving the health of populations remains top priority to the Government, this being the harbinger for Cameroon's socioeconomic development and ambitions. The Government looks forward to attaining this objective by ensuring that the Health Sector Plan is put in place through a holistic approach axed on systemic research that garners inter-sectoral synergies. The objectives of the Health Sector Plan were updated especially with regards to the target year of 2015 in relation with the Millennium Development Goals (MDG).

At the national level, annual expenditure on health per head is estimated at 12,774FCFA. It should be noted that in Cameroon healthcare is principally financed by the state.

According to WHO recommendation this allocation has to be 10% of the annual budget. However, until 2008 annual health allocation hovered around 5% of the national budget.

According to ECAM 11, households' direct and annual contribution to healthcare is over 7.6%.

Whereas Councils and Insurance structures contribution to healthcare is negligible, support to healthcare from External Aid are significant.

According to the National Committee for the Fight against HIV/AIDS, the prevalence rate of HIV/AIDS in Cameroon is 5.1% with the number of people living with HIV estimated at 553.000.

The rate of medical consultation in the informal health sector is currently estimated at 29.7% as against 24.5% in 2001. The slight increase is due to the increase in the number of CIG/NGO's in the health sector as well as to medicine peddlers who cover 18.4% of medical consultations carried out in informal health structures.

II. SITUATIONAL ANALYSIS³

The NPPFERZ is based on early detection and rapid fight against pathogens in animals and their ecology before they become a threat to human health. In this section, it is also important to describe the current systems of epidemiological surveillance, control and research and the degree of importance of zoonoses in the training syllabuses of animal, human and environmental health personnel. This presentation being the fruit of an investigative field work, is articulated around five major points namely;

- (1) The systems of epidemiological surveillance, investigation and disease control used in animal and human health;
- (2) The situation of zoonoses in Cameroon
- (3) Regulatory framework employed in the prevention and fight against zoonoses
- (4) Training
- (5) Research.

2.1. EPIDEMIOLOGICAL SURVEILLANCE AND PREVENTION SYSTEMS EMPLOYED IN FIGHTING ANIMAL AND HUMAN DISEASES

In Cameroon two Ministerial Departments are charged with animal and human health. They are the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) for animal health (domestic and wild) and the Ministry of Public Health (MINSANTE) for human health. Environmental Health is taken care of by the Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED).

Analyzing the epidemiological surveillance systems currently utilized in animal and human health leads to the following observations:

⇒ **MINEPIA**

By Decree N° 2005/15² of 4th May 2005 organizing the Ministry of Livestock, Fisheries and Animal Industries, the Directorate of veterinary services (DSV), is charged with the elaboration, execution, monitoring and evaluation of Government's policies, strategies and Programs as concerns Sanitary Protection and Veterinary Public Health. She is also responsible for Veterinary Health Inspection, the fight against zoonoses, the monitoring of trans-frontier zoo-sanitary issues, the institution and management of Veterinary Mandates.

However, an appreciation of the organigram of MINEPIA reveals insufficient coordination between central and decentralized veterinary services as well as a lack of effective presence of veterinary services across the country. The presentation and perception of veterinary services is still overwhelmingly public as exemplified by weak integration of private veterinarians in veterinary services delivery systems. There is no plan for continuous staff training at all levels. Equally, current veterinary sanitary inspection is not adequately integrated into the epidemio-surveillance system of animal diseases.

Since 2004 and following the commencement of the PACE Program under the auspices of AU-IBAR, the epidemio-surveillance system (RES) was put in place and markedly reinforced

³ Concise presentation (for details c.f. earlier related reports)

enabling Cameroon to attain in 2008, the provisional freedom from Rinderpest Disease status. Today RES carries epidemio-surveillance of some major trans-frontier animal diseases⁴.

In addition to the eradication of Rinderpest, other achievements of RES include enhanced collaboration and networking with LANAVET and CPC laboratories. Good collaboration with MINFOP during Rinderpest eradication and with MINSANTE as well as with other Ministerial Departments during the fight against HPAI H5N1 (Bird Flu) highlights the importance of inter-sectoral synergy with the appropriate training and sensitization of stakeholders including consumers.

Despite these successes, some weaknesses still remain especially as concerns the institutional and operational functioning of the epidemio-surveillance network (RES). For example within the central coordination of RES, there is weak integration if any of veterinary, public health and wildlife services; worse still ,its decentralized or field structures are yet to sufficiently or significantly include these services be they public or private.

Communication and networking between the limited staff of RES and other MINEPIA staff are also weak consequent of the structuring and function of PACE. With the end of PACE and the cessation of external funding hence motivation to staff of RES, the gathering of useful epidemio-surveillance information or data became increasingly difficult, resulting in considerable underreporting of diseases with all negative consequences. This lack of sufficient disease information gathering and sharing between staff of RES and other MINEPIA staff is a very serious drawback to disease surveillance. Limited budgetary allocations as well as weaknesses in its mobilization mechanisms are other important drawbacks. Other drawbacks include the absence of any surveillance system for emerging diseases and the insufficient integration of veterinary sanitary inspection as a surveillance tool.

⇒ *MINFOF*

Within her mission as custodian of wildlife, there are no legal or regulatory instruments concerning disease surveillance or control. Meanwhile the discovery of cases of deaths among great apes, small primates and cephalophes due to anthrax brought the authorities of this Ministerial Department to include the conservation of primates, the creation of an epidemio-surveillance and response unit and the fight against diseases in their action plan (MINFOF, 2005).

The importance of zoonoses was clearly highlighted by the presence of anthrax in the Dja Reserve as well as threats of Ebola Fever in some neighboring countries.

In this light and based on the risk involved, specific actions are foreseen in each reserve or sanctuary notably the training of eco-guards for surveillance, disease control, sensitization of the local communities, setting up disease control programs, carrying out regular epidemiological surveys as well as special animal and human health activities.

To analyze things we regret that these activities didn't really take off well in MINFOF for a clear reason, the lack of specialist veterinary personnel in wildlife pathology. Likewise the epidemio-surveillance network envisaged including budgetary allocations is yet to be put in place.

⁴ **CBPP, PPR, ASF, Newcastle Disease, FMD and HPAI H5N1** are amongst the animal diseases of the surveillance system in 2006

⇒ **MINSANTE**

Decree N° 2002/2009 of 9th August 2002 organizing the Ministry of Public Health placed the coordination of epidemiologic surveillance under the Directorate for the Fight against Disease (DLM). The active surveillance of targeted diseases of the Enlarged Vaccination Program (PEV) comes under the Directorate of Family Health (DSF), while the passive surveillance of infections that are not in the MAPE Program is by the Directorate of Studies and Projects through the National Health Management Information system (NHMIS). To these three structures is added the National Observatory for Public Health (ONSP) created on the 1st of November 2010 by decree 2010/2952/PM.

ONSP supports the technical Directorates of MINSANTE through an early warning and sanitary watchdog mechanism that enables her to centralize, analyze and make available socio-sanitary information and data on public health problems.

Elaboration of the sectoral strategy on health in 2001 took cognizance of most health priorities of the country and on this basis; the putting into place of an epidemiological surveillance network at three levels namely; central, intermediate and peripheral levels was envisaged.

Analyzing the epidemio-surveillance system of the Ministry of Public Health reveals several strengths notably:

- A good collaborative relations with many financial and technical partners (UNAIDS, WHO, World Bank, ADB etc)
- A good organizational set up functioning with trained and sufficiently engaged personnel and with well adapted collection tools.
- The existence of a National Integrated Surveillance guide for Disease Control and Response (SIMR) as well as the International Sanitary Regulation (RSI).
- There also exists an epidemiologic calendar, a weekly report as well as a weekly national coordination meeting with the participation of laboratories such as CPC, GVFI and LEID

This same analysis also brings to light some drawbacks of the system notably the existence of several uncoordinated surveillance components at the intermediary and peripheral levels, the deadline for sending out notices at times is too long; there is little or no collaboration between the epidemio-surveillance system with various hospitals (Reference or Regional hospitals, certain clinics) . In addition the integration of satellite programs like Tuberculosis, Leprosy, HIV/AIDS, Onchocercosis, and Malaria etc in the surveillance network is not effective. There is also the lack of inter-sectoral geo-referencing, low detection and investigation capacity as well as slow response to public health emergencies; insufficient training/ supervision as well as the absence of a simulating or proactive mechanism and retro-information flow system.

⇒ **MINEPDED**

At the Ministry of the Environment, there is no organized system for epidemiological surveillance; however, by laid down texts, MINEPDED is responsible for protection missions accompanying surveillance activities in the different environments (terrestrial, aquatic, coastal and marine). It is worth noting that environment and ecosystems protection are integral parts of the 1996 National Plan for Environmental Management (PNGE) in Cameroon.

Generally analyzing the two functional surveillance systems (MINEPIA and MINSANTE) above reveal the following:

- (1) The absence of an integrated geo-referencing map indicating the distribution of diseases, their vectors and their animal or wildlife reservoirs in line with the ‘ One Health’ approach enabling a thorough appreciation of sanitary risks especially zoonotic disease risks, such that, proactively the best and appropriate preventative and control measures are put in place following the multi-disciplinary and inter-sectoral approach.
- (2) The absence of a well equipped, inter-sectoral health watchdog unit within the sectors directly implicated with the problems of zoonoses as well as with emerging and re-emerging diseases.

The inter-sectoral epidemiological surveillance system envisaged within this Program should take cognizance of these inputs among other things to guarantee its efficiency.

2.2. SITUATION OF ZOONOSIS IN CAMEROON

Zoonosis is an infection or infestation naturally transmissible from animal to man and vice versa. It is caused by diverse biological agents (viruses, bacteria, fungi etc) following complex interactions of a reservoir, a host and the infectious agent within a milieu in which each factor evolves under the pressure of the other 3 factors.

⇒ Determinant of emerging and re-emerging zoonosis

It is generally accepted that the emergence⁵ or re-emergence⁶ of zoonosis is linked to certain determining or favoring factors of which the principal ones are:

- 👉 Climate change
- 👉 Deforestation which deteriorate natural environment and habitat
- 👉 The high demand in natural resources due to the high growth in population
- 👉 The increase of man`s pressure on wildlife
- 👉 Changes at the level of agricultural soils and the environments
- 👉 World trade in exotic animals
- 👉 International travel

In Cameroon, the emergence or reemergence of zoonotic diseases can be explained by:

- 👉 Climatic and agro-environmental factors coupled with poor land use as well as limited agro-pastoral space which forces sections of the population into protected areas or parks consequently increasing the risk of zoonosis

⁵ WHO, FAO, OIE (2004) define an emerging zoonosis as a zoonosis that is newly recognized, or newly evolved, or that has occurred previously but shows an increase in incidence or expansion, geographical, host or vector range.

⁶ Reemerging zoonosis – known zoonosis whose epidemiology notably incidence, prevalence, distribution etc show mark increase

- ☞ Forest exploitation which enhances poaching and hence the supply of uninspected bush meat to rural and urban dwellers. Narrowing the human and wildlife interface especially through contact with bush meat markedly exposes stakeholders to zoonotic disease risks.
- ☞ The search for new agro-pastoral lands reduces the interfaces between humans and wildlife and between domestic animals and wildlife markedly increasing the risk of emergence or re-emergence of zoonotic diseases
 - HIV/AIDS infections promote the emergence of zoonoses such as toxoplasmosis, tuberculosis with at times multiple resistances to tuberculosis treatment.
 - Socio-cultural practices commonly linked to certain rituals expose the population to various animal fluids⁷, likewise certain feeding habits⁸; these enhance risks to zoonoses.
 - Socio-political factors such as the repression of poaching without the provision of alternative sources of revenue or animal proteins; absence of a common strategy to fight zoonoses by countries of the Congo Basin despite the fact that this sub-region is a hotspot for the emergence of zoonoses; non-gratuity of the anti-rabies vaccination; absence of a law on stamping out with provision of compensation to livestock farmers
 - The ignorance of the risks of infection by those most at risk (handlers of bush meat and domestic animals) such as housewives, hunters, eco-guards and butchers;
 - Inadequate information as well as knowledge on the risks and consequences of exposure by some professionals (animal health assistants, eco-guards etc) to zoonoses.

2.3. ZOO NOTIC RISKS AND POPULATIONS AT RISK

So far a general idea on populations at risk of zoonotic diseases as well as the degree in their perception of these risks has been presented. As a whole, the risks exposed to depends on one's professional activities (hunters, restaurant workers/owners, health inspectors, eco-guards, veterinarian, butchers, herdsman etc), personal hygiene/ feeding habits (eating of raw meat or fresh milk) as well as on socio-cultural practices (rites). Apparently, rural populations exposed to poverty or miseries are most vulnerable to zoonotic risks.

Generally, anyone who has regular or permanent contact with animals (domestic, wildlife) living or dead or with the body fluids of animals (blood, lymph, urine) is at risk; in the presence of poor hygiene the risk is much higher.

It is estimated that about 92% of the population living around or in protected areas (parks etc) practice either crop farming and /or animal husbandry. In grazing areas, more than 60% of

⁷ Purification – bathing with a concoction constituted with blood from different animals (goats, poultry etc) followed by skin scarification and application of a mixture of animal blood, palm oil and wood ash.

⁸ Consumption of raw meat or milk obtained from domestic animals

people interviewed confirmed the existence of contacts between domestic and wild animals. In some localities the human and animal populations access the same water sources especially during the dry season. More than 29% of the investigation estimates that the practice of poaching is high. It is also worth noting that 41% of persons interviewed acknowledge having seen at least one wild animal in captivity.

2.4. REGULATORY FRAMEWORK ON THE PREVENTION AND FIGHT AGAINST ZONOSSES

The regulatory framework of the Ministries involved in the NPPFERZ provides a series of texts on Human Health (MINASANTE), Animal Health (MINEPIA), Risks, Disasters and Contingency Plans (MINATD), on the Protection of the Environment (MINEPDED) and on Wildlife (MINFOF)

⇒ MINEPIA

- ☞ Law N°2000/017th of 19 December, 2000 regulating Veterinary Sanitary Inspections brings out a list of 25 zoonoses known in Cameroon out of the 180 known to the OIE. However, this law authorizes through a joint Arête, the Ministers in charge of Animal Health and Public Health to add on to this list any other zoonoses whenever need be.
- ☞ Law N° 2001/2006 of 16th April 2001 on Nomenclature and Zoo-Sanitary Regulation of diseases legally recognized as contagious and whose declaration or reporting is obligatory gives precision concerning some zoonoses. In addition to animal health, these two laws in articles 3, 4 subsections 2 and 12, also take into account human and environmental health. Besides the control of food from animal and aquatic origins through ISV, MINEPIA, by inspecting fishing vessels, regulating and controlling cattle markets, grazing land, cattle routes, abattoirs as well as supervising fisheries production also take part in protecting the environment.
- ☞ The recent decree N° 2011/408 of 9th December 2011 organizing the Government, reemphasizes the importance of adequate hygiene in all stages as concerns foodstuffs of animal and aquatic origins (DAOAH) re-conferring the application of measures aimed at the conservation and development of these resources to MINEPIA.

⇒ MINSANTE

- ☞ Law N° 96/03 of 4th January 1996 addressing the Health sector, in article 4 subsection 6 insists on the creation of a preventive medicine policy that promotes hygiene, environmental sanitation, vaccination and health education. The inter-sectoral character of this policy is important in the fight against zoonoses.
- ☞ The national guide on Integrated Disease Surveillance and Prevention (SIMR,2005); re-enacted by WHO/AFRO in 2010 and adopted by Cameroon in 2011; as well as the International Sanitary Regulation (RSI)
- ☞ The organigram of MINSANTE which shows an Epidemiologic Surveillance System with several components with the DLM playing the role of National and Trans Border Coordinator.
- ☞ Decree N° 2010/2952/pm of 1st November 2010 on the creation, organization and functioning of the National Public Health Observatory

- 👉 The recent decree N^o 2011/408 of 9th December 2011 reorganizing the Government of Cameroon as well as creating a Secretary of State in the Ministry of Public Health charged with the Fight against Epidemics and Pandemics in Cameroon.

These are testimonies to the top priority that the President of the Republic, Head of State, gives to the fight against epidemics and pandemics throughout our national territory.

⇒ ***MINFOF***

Regulatory texts conferring the surveillance of degrading forestry ecosystems as well as the protection of biodiversity throughout and including Protected National Parks⁹ to MINFOF are:

- 👉 Law N^o01/94 of 20th January ,1994 on forests wildlife and fisheries and
- 👉 Decree N^o 2005/099 of 6th April 2005 organizing the Ministry of Forestry and Wildlife

⇒ ***MINEPDED***

- 👉 Amended law N^o 96/12 of 5th august 1996 concerning Environmental Management
- 👉 Decree N^o 2005/117 of 14th April 2005 organizing the Ministry of Environment and Protection of Nature modified and completed by decree N^o2005/196 of 31st December 2005 organizing MINEP which confers to MINEPDED the mission of protection in addition to actions of surveillance of terrestrial, aquatic, coastal, marine and fresh water environments.
- 👉 Decree N^o 2011/408of 9th December 2011 organizing the Government confers to MINEP the responsibility of elaborating the Major Sectoral Plans for Environmental Protection with related Ministerial Departments and informing the public to let her participate in the management, protection and restoration of nature and the environment

⇒ ***MINATD***

- 👉 Amended law N^o 96/12 of 5th august 1996 concerning Environmental Management
- 👉 Decree N^o 2005/117 of 14th April 2005 organizing the Ministry of Environment and Protection of Nature .modified and completed by decree N^o2005/196 of 31st December 2005 organizing MINEP which confers to MINEPDED the mission of protection in addition to actions of surveillance of terrestrial, aquatic, coastal, marine and fresh water environments.
- 👉 Decree N^o 2011/408of 9th December 2011 organizing the Government confers to MINEP the responsibility of elaborating the Major Sectoral Plans for Environmental Protection with related Ministerial Departments and informing the public to let her participate in the management, protection and restoration of nature and the environment

⁹ Animal health was identified and included in the National Plan developed in 2005 for the protection of big monkeys following outbreaks of anthrax in this species in the DJA Reserve as well as threats of Ebola in neighboring Gabon. The urgency for a surveillance system on wildlife diseases cannot be overemphasized.

2.5. STATE OF TRAINING

Following visits to various administrations, training institutions as well as dialogues with relevant teachers in the field, the following can be highlighted:

1) At the primary and secondary school levels, no teaching on zoonoses is programmed or taught.

2) At the level of professional training :

- ☞ In National Centers for Zoo-Technical and Veterinary Training (CNFZV) with mission to train veterinary nurses and Livestock Technicians, zoonoses are integral parts of pathology lectures. However, the superficial nature of these lectures leaves students wanting with regards to understanding the intricacies of zoonoses.
- ☞ In schools of wildlife, Forestry and Water, courses in animal pathology are taught however, no emphasis is laid on zoonoses.
- ☞ In the training schools for nursing and medical health technicians, pathology courses fail to highlight the zoonotic aspect of human diseases
- ☞ Personnel of slaughterhouses, butchers' shops, herdsmen, animal keepers, protected areas, agro-pastoral centres, traders in bush meat and other stakeholders, receive neither training nor information on zoonoses.

3) At University level :

- ☞ Medical training schools have zoonotic pathology in their syllabus. However, courses taught focus more on human aspects of zoonoses with little or no attention to its broader dimensions.
- ☞ In the veterinary medical training schools of Ngaoundere and Bagante, more than 30 hours courses on zoonoses are envisaged.
- ☞ In the six state universities , masters degree programs offered include:
 - A masters degree in Standards and Quality Control of agro-pastoral and forestry products (FASA)
 - A master degree in hygiene, quality and environment at University of Douala; a Master Degree in Environmental Sciences at the University of Buea
 - At the University of BUEA Master degrees can be obtained in the following; Environmental Sciences, Nursing and Education, Microbiology, Parasitology and Virology.
 - A master degree in Public Health is offered at the Faculty of Medicine of the Universities of BUEA and Yaoundé I
 - An international course on the Inspection of Foodstuff of Animal Origin is going on at the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I

4) At the doctoral level , many PhD research topics on zoonosis notably tuberculosis and cysticercosis are on going

5) **Training syllabus at pre-university levels** are decided upon and endorsed at the level of the Ministry in charge of the concerned school. For professional training, the curriculum is endorsed by the Ministry in charge; in private institutions, supervision is by a caretaker University. With regards to State Universities, after elaboration of their syllabuses by competent academic Departments / Faculties, their syllabuses are subjected to approval by relevant Directorates of the Ministry of Higher Education.

6) **The cost of training** varies from one level to the other and is a function of the type of institution concerned.

☞ In state universities, the flat rate of annual tuition is 50.000FCFA; Masters Degrees cost around 600,000FCFA for tuition and research.

☞ In private institutions school fees vary from 250.000 to 450.000FCFA; however, a Master's Degree fee costs between 600.000 and 1.000.000FCFA.

7) Infrastructure and Personnel

Understaffing of training schools for medical and veterinary medical students especially in permanent and qualified staff as well as lack of adequate laboratory equipment constitute serious limiting factors

8) Inter-University relation

Even when relations exist with overseas universities, interuniversity cooperation in Cameroon is not yet formalized.

2.6. STATE OF RESEARCH

In matters of scientific research, MINRESI is the Ministerial Department most concerned. It is at this level that all types of research are carried out in Cameroon. Some research is also done at the level of MINESUP through universities where more or less fundamental research is carried out and also at some laboratories¹⁰ such as LANAVET, Centre Pasteur du Cameroon, GVFI, LEID and at CREMER/PRESICA.

It is important to stress the key roles of MINRESI and MINSUP in the NPPFERZ Program especially as concerns research. However, what is the state of zoonosis research in Cameroon?

Without being exhaustive, research topics on zoonosis in the country generally center on the transmissibility of pathogenic agents from non human primates to man, on risky practices and behaviors or on the prevalence of some known zoonoses. On this basis we acknowledge :

- The works of NATHAN D wolfe et al, (2004) and (2005) on the risks linked to proximity and contacts between hunters in Cameroon and non-human primates. These studies

¹⁰ GVFI laboratory does sentinel surveillance on certain infectious diseases; she also carries out research on emerging infectious diseases. She has important research results on parasites of wildlife, SIV, SFV, Monkey Pox, Simian Herpes and hepatitis etc.

CREMER/PRESICA carries research on SIV and malaria

The animal health laboratory at FASA undertakes research on swine cysticercosis.

demonstrate that not only can hunters in the forest region of Cameroon naturally contract the simian immunodeficiency virus but also that the exposure of man vis-à-vis non-human primates can lead to the emergence of infections such as HIV ,malaria and the HTLV V-I

- Marcial K et al, (2005) revealed the high exposure of Cameroonian hunters to SIV; likewise ANA MACHUCA et al (2005) showed the prevalence of the human leukemia virus in rural populations of Cameroon.
- LEBRETON et al (2006) revealed the presence of Rift Valley Fever in goats in Cameroon; LEBRETON (2007) revealed that some persons living with HIV-I in Cameroon had been previously exposed to wild primates.
- KUNIHOLM H.M. et al (2006), researched on the infection of Cameroonian adults by *arboviruses* through studying the sero-prevalence and distribution of togaviridae, *flavoviridae* and *bunyviridae* in rural populations.

Other research works like those above were based on primate viruses and the possibility of their transmissibility to humans in Cameroon. Examples include: work by LUCIE ETIENNE on a new SIV infecting chimpanzee and producing similar symptoms like AIDS; Sintasath M.D. et al, on the characterization of STLV-3 of cercopithec; ZHENG H. et al, on the emergence of a new HTLV in hunters of primates in Cameroon; MPOUNDI NGOLE on SIV and malaria.

Researchers like BRIAN L PIKE et al, are interested on the role of human/animal interface in the emergence of zoonoses amongst butchers in Cameroon. Other relevant works: Pourreau X. et al (2011) on gastro –intestinal parasite; Rich M.S, (2009) on the origin of shrewd malaria; Fabian H. et al, (2006) on anthrax in the Dja Reserve.

Cameroonian researchers are also strongly implicated in research on zoonosis, we note; ZOLI A.P. (2009) on cysticercosis; AWAH NGUKUM on the zoonotic importance of bovine tuberculosis in Cameroon; ASSANA E, on the search for a vaccine against cysticercosis; WADE et al, on the prevalence of tuberculosis and bovine brucellosis in the Garoua slaughter house; NDIP M.L. (2011) on Rickettsia and canine Erlichiosis. Meanwhile, there is no networking for the ventilation or publishing of these research results in Cameroon. Drawbacks with some of these researches include :

- 👉 Protocol not multi-disciplinary;
- 👉 Lack of private sector interest or support;
- 👉 Limited coordination and synergy amongst researchers;
- 👉 Research orientations mainly informal with limited national or sector coordination;
- 👉 Most financing from overseas with limited focus on national priorities;
- 👉 Limited exploitation of research results especially as concerns improvement in training and various applications

It is worth noting that for scientific research on zoonoses in Cameroon to improve all these weaknesses and strengths highlighted must be taken into consideration.

III. VISION, OBJECTIVES, RISKS AND CONSTRAINTS OF THE PROGRAM

3.1. VISION

By 2035, Cameroon should be an international reference in matters of prevention and fight against emerging and re-emerging zoonotic diseases.

3.2. GENERAL OBJECTIVES

The general objectives envisaged by the program include:

- 1) The promotion of the “One Health” approach as a National strategy instrument;
- 2) Reinforcement of collaboration between national services for animal health(domestic and wildlife) human health and environmental health so as to improve on the surveillance , investigation and prevention of zoonoses;
- 3) Contain the major risks of contamination of human populations by emerging and re-emerging zoonoses from domestic and wild animals¹¹;
- 4) Reinforce and improve on services offered in fighting zoonoses , through training and capacity building of the stakeholders at the national level;
- 5) Promotion of scientific research on zoonoses.

¹¹ especially Hemorrhagic fever caused by Ebola virus, Marburg fever, RVEF, Anthrax, Yellow Fever, HPAI H5N1, Tuberculosis, Rabies etc

IV. THE STRATEGIC AXIS OF THE PROGRAM

The National Program for the Prevention and Fight against Emerging and Re-emerging zoonoses (NPPFERZ) is an instrument promoting the national strategy on health based on the “One Health” approach. It is articulated around three strategic axes constituting its three components namely;

- 👉 **Component 1** : Reinforcement of Epidemiological Surveillance, Investigation and Prevention of Emerging and Re-emerging Zoonoses;
- 👉 **Component 2** : Reinforcement of Basic and Operational research on Zoonoses;
- 👉 **Component 3** :Reinforcement of Training in the Prevention and Fight against Emerging and Re-emerging Zoonoses

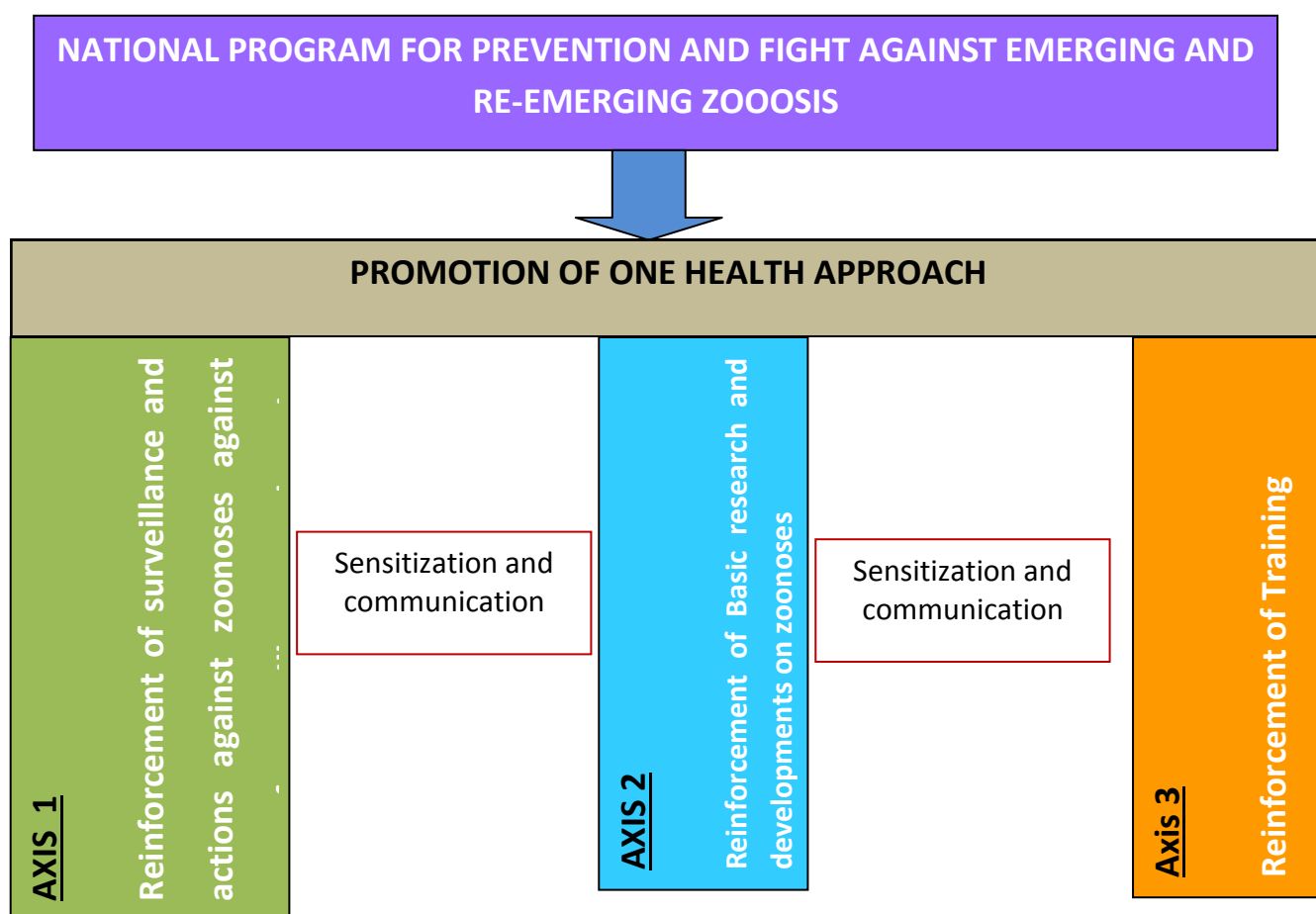


DIAGRAM 1: STRATEGIC AXIS OF THE PROGRAM

The details of the three components are presented below

4.1. COMPONENT 1: REINFORCEMENT OF EPIDEMIOLOGICAL SURVEILLANCE, INVESTIGATION AND PREVENTION OF EMERGING AND RE-EMERGING ZOOSES

Collaboration between services in charge of animal health, human health and environmental health in the epidemiological surveillance of zoonosis enables the rapid detection of outbreaks of zoonoses, their appreciation as well as the rapid institution of appropriate control measures thus preventing their becoming public health emergencies with all negative sequelae.

Such collaboration hinges on epidemiological surveillance, planning, preventative measures and appropriate communication on sanitary risks.

The objectives of this component are as follows:

4.1.1 GLOBAL OBJECTIVE

Reinforcement of epidemiological surveillance and control of emerging and re-emerging zoonoses

4.1.2. SPECIFIC OBJECTIVES

Ensure a multi-sectoral approach on epidemiological surveillance and control ;

- ☞ Ensure early detection of cases.
- ☞ Ensure the collection and management of data at all levels
- ☞ Reinforce diagnostic capacities
- ☞ Involve communities in surveillance and prevention activities
- ☞ Reduce the risks of exposition and transmission of zoonoses to man and from man to man
- ☞ Take full charge of cases
- ☞ Reinforce the preventive capacities to epizootic or epidemics of zoonoses .

4.1.3. EXPECTED RESULTS

- ☞ The multi-sectoral strategy is applied in the case of epidemiological surveillance and prevention
- ☞ Early detection of cases are assured
- ☞ Collection and management of data is assured at all levels
- ☞ Diagnostic capacities are reinforced
- ☞ Communities are involved in surveillance and prevention activities
- ☞ Exposure and transmission risks of zoonoses to man are reduced
- ☞ Prevention capacities to epizootic or epidemics are reduced.

4.1.4 DESCRIPTION OF ACTIVITIES

Executing this component depends on the division of objectives into activities thus;

- ☞ **Objective 1:** Apply a multi -sectoral strategy with regards to epidemiological surveillance and control

Activities

- 1) Elaborate and put up common projects in matters of surveillance and prevention
- 2) Form multi-sectoral surveillance and prevention committees
- 3) Hold regular multi- sectoral meetings on surveillance and prevention at all levels
- 4) Organize joint investigation and follow up missions on the field
- 5) Put in place a network of sharing information on zoonoses
- 6) Establish a list of priority zoonoses

👉 **Objective 2:** Assure early detection of cases

Activities

- 1) Set up an inter-sectoral system of sanitary watchdog at all levels
- 2) Do investigations in order to map out zoonotic risk areas.
- 3) Identify and establish surveillance watchdog site
- 4) Establish a priority list of zoonoses with case definition and guidelines for each listed disease
- 5) Elaborate and apply protocols for the surveillance of zoonoses
- 6) Give refresher courses to veterinarians, hunters' guides, conservationists and eco-guards on key aspects of wild life surveillance.
- 7) Train /recycle stakeholders (health personnel, staff at sentinel sites and at frontier control posts) on protocols of surveillance, investigation and prevention of zoonoses
- 8) Put in place early warning signals and procedures
- 9) Develop and apply packaging, conservation, transportation and marshalling procedures of specimens
- 10) Elaborate and put into place a framework for trans-boundary surveillance

👉 **Objectives 3** :Assure the collection and management of data at all levels

Activities

- 1) Set up a data base on zoonoses
- 2) Train staff on how to use the data base
- 3) Set up a transmission network of the database
- 4) Activate the data base
- 5) Produce and regularly disseminate information sheets on epidemiology
- 6) Ensure and check information flow (reminders) at all levels

👉 **Objective 4** : REINFORCE DIGNOSTIC CAPACITIES

Activities

- 1) Re-evaluate national laboratories

- 2) Organize refresher courses for laboratory specialists and for field staff on sample collection and marshalling techniques
- 3) Elaborate and apply standard operational procedures
- 4) Train laboratory specialists on the application of protocols of surveillance and prevention of zoonoses
- 5) Evaluate and equip laboratories with sample collection and diagnostic equipment
- 6) Equip and train field workers on the use of rapid detection kits
- 7) Provide laboratories with equipment chemicals and necessary working logistic material
- 8) Update national reference laboratories enabling them to meet up with international standards
- 9) Establish laboratory networking

👉 **Objective 5 :** Communities involvement in surveillance and prevention activities

Activities

- 1) Involve the communities in elaborating and setting up surveillance and control activities against zoonoses

👉 **Objective 6:** Reduce the risks of exposure and transmission of zoonosis to man as well as its transmission from man to man.

Activities

- 1) Conceive a vaccination plan for all targeted populations against diseases like rabies brucellosis etc.
- 2) Capacity building at all levels notably for trainers, supervisors and other major stakeholders
- 3) Acquire and dispatch relevant vaccines and related materials to the regions
- 4) Carry out vaccination campaigns in the regions
- 5) Fight against stray dogs, free ranging animals and other potential reservoirs of zoonoses.
- 6) Reinstate Municipal animal hold-ups
- 7) Reinforce the inspection of products of animal or aquatic origins (meat, fish ,milk etc) as well as public restaurants
- 8) Construct and put into use, quarantine stations
- 9) Elaborate and apply stamping-out measures on infected, contaminated or exposed animals with provision of financial compensation to owners.
- 10) Sensitize the population on the dangers resulting from contacts
- 11) Fight against poaching
- 12) Demarcate boundaries between grazing zones and protected parks in order to limit contacts between domestic and wild animals

- 13) Put in place preventive control measures for people at risk (reinforce surveillance at border posts and airports)
- 14) Conceive and apply veterinary health inspection procedures for bush meat and other wild life products
- 15) Create and equip isolation centers (quarantines) for patients in all region and border posts and make them operational.

👉 **Objective 7 : Management of cases**

Activities

- 1) Produce and circulate the protocol on case management
- 2) Order and pre-position personal protection equipment
- 3) Build-up appropriate vaccines stocks
- 4) Ensure the proper and charge-free management of cases in isolation or quarantine centers.
- 5) Make sure facilities for the proper and charge-free management of zoonotic disease cases are in all the Regions of the nation
- 6) Train personnel (doctors, nurses, lab technician) on the proper management of cases

👉 **Objective 8:**

Activities

- 1) Reinforce preventive and control capacities against epidemic or epizootics of zoonoses
- 2) Conceive and set up a contingency plan for emerging and re-emerging zoonoses
- 3) Carryout simulation exercises from time to time
- 4) Create rapid intervention team/brigades at all levels

4.2. COMPONENT 2: REINFORCING SCIENTIFIC RESEARCH ON ZOONOSIS

The capability of countries to meet up challenges in public health on the one hand and specifically in the field of emerging or re-emerging zoonosis on the other hand is intrinsically linked with the level of fundamental and operational research, especially in the study of the emergence of new zoonoses and the analysis and evaluation of risks. This should be done in an interdisciplinary manner and should have private sector support to produce indispensable tools for training

4.2.1 GLOBAL OBJECTIVE

Promote fundamental and operational research on zoonoses

4.2.2 SPECIFIC OBJECTIVES

- 1) Coordinate and structure research on zoonoses
- 2) Elaborate research framework on major zoonoses
- 3) Upgrade human and infrastructural resources.
- 4) Identification of new pathogens

- 5) Identify risk factors which favor the propagation of zoonoses and the determinants for behavior change
- 6) Develop strategies for vaccine research
- 7) Develop new technologies
- 8) Develop useful tools for decision making in Public Health
- 9) Set up a framework to disseminate research results.

4.2.3 EXPECTED RESULTS

- 1) An efficient, national structure put in place
- 2) Zoonoses placed as top priority
- 3) Availability of qualified personnel with appropriately equipped centers
- 4) Detection of new pathogens
- 5) Identification of risk factors, risky behaviors; sanitary risks effectively analyzed
- 6) Development of appropriate animal vaccines
- 7) Develop new techniques (taking sample information system, platform)
- 8) Economic/scientific evaluation and modeling
- 9) Research results disseminated and put into application

4.2.4 DESCRIPTION OF ACTIVITIES

This component is geared toward (08) specific objectives divided into the following activities

👉 **Objective 1:** Organize and structure research on zoonoses

Activities

- 1) Complete the composition, attributes and functioning modalities of the committee responsible for the issuing of research authorizations
- 2) Finalize the composition of a national ethics committee
- 3) Review and standardize research authorization (ethical and administrative)
- 4) Compile and update publication, data and reports on zoonoses in Cameroon
- 5) Set up a directory of researchers in the domain of zoonoses
- 6) Create a national network of researchers on zoonoses in Cameroon with members linked via a website
- 7) Set up a repertoire of researchers on zoonoses in Cameroon
- 8) Create a network of laboratories involved in zoonotic research in Cameroon
- 9) Create a platform for research on zoonoses.

👉 **Objective 2:** Elaborate a research framework on major zoonoses

Activities

- 1) Organize a national workshop for the consensual prioritization of zoonoses and the programming of relevant research activities

👉 **Objective 3:** Upgrade human and infrastructural resource capacities

Activities

- 1) Train workers on sampling, capturing, labeling and marshalling of specimens for diagnosis of major zoonotic diseases.
- 2) Develop research themes on emerging and re-emerging zoonosis adopting the “One Health” approach
- 3) Support institutions and universities in the area of diagnosis, epidemiology and prevention of major zoonotic diseases
- 4) Carry out research on the socio-economic impact of zoonoses including cost-benefit analysis on preventive methods.
- 5) Support professional and academic training
- 6) Identify needs and furnish appropriate materials and equipment to functioning research structures

👉 **Objective 4**

- 1) Identification of new, emerging pathogens
- 2) Map out high risk site for emerging zoonoses
- 3) Carry out epidemiological surveys
- 4) Develop adapted tools for the detection of new pathogens
- 5) Analyze health/sanitary risks
- 6) Establish therapeutic protocols and follow up on their efficiency
- 7) Study of treatment related resistance
- 8) Structure the different levels of biological analysis and specimens transfer

👉 **OBJECTIVE 5:** Identification of risk factors that favors the propagation of zoonoses as well as determinants for behavioral change

Activities

- 1) Carry out epidemiological, behavioral, economic and anthropological surveys on zoonoses
- 2) Carryout spatio-temporal modeling of infectious processes in relation to ecologic, epidemiologic and socio-economic determinants

👉 **Objective 6:** Develop strategies for vaccine research

Activities

- 1) Identify the diversity and isolate circulating subtypes
- 2) Carry out vaccine trials

👉 **Objective 7 :** Develop new technologies

Activities

- 1) New techniques in the collection of samples adapted and validated in the context of Cameroon
- 2) An information system that authorizes the sharing of classified or protected data(inter / intra-ministerial etc)
- 3) New platform for biological analysis

👉 Objective 8 : Develop guiding tools for Public Health decision making

Activities

- 1) Scientific/economic evaluation of preventive measures (study of impact measures)
- 2) Creation of model guides to decision making (spread/ propagation of epidemics, models permitting pre-testing different health policies or development aid, epidemic detection models etc)
- 3) Evaluation of governance models in Public Health

👉 Objective 9 : Put in place a framework to valorize research results

Activities

- 1) Organize annual forum for the restitution of research work and results
- 2) Set up a legal framework for the management of useful discoveries
- 3) Create a national journal on zoonoses

4.3. UPGRADE TRAINING IN PREVENTION AND FIGHT AGAINST EMERGING AND RE-EMERGING ZOOSES

Training is at the centre of the Program. To this end, it is the pivot which guarantees the renewal and recycling of human resources necessary for the prevention and fight against emerging and re-emerging zoonoses. In practice, training has to be transversal cutting across all disciplines and involving all levels. For strategic reasons a specific component with 4 levels has been consecrated to training:

- 1) Pre- university level (primary school, secondary grammar schools, secondary technical school, laboratory technician training schools ,veterinary nursing training schools, agro-pastoral personnel training schools, school of wildlife and forestry etc)
- 2) University level
- 3) Post-university level
- 4) Private sector

4.3.1 Global objective

Train stakeholders in animal (domestic /wildlife) and human health in the surveillance and prevention of zoonotic diseases.

4.3.2 Specific objectives

- 1) Integrate the “One Health” approach in the pre-university, university and post-university syllabuses

- 2) Set up a university network of researchers on the “One Health” approach
- 3) Train stakeholders in animal (domestic /wild) and human health in integrated surveillance and prevention of zoonoses
- 4) Sensitize the population on the ‘One health’ approach and bring about behavioral changes within communities

4.3.3 Expected results

- 1) The “One Health” vision is integrated in training syllabuses /curricula as well as in research programs
- 2) Stakeholders in the epidemiological surveillance system are trained on surveillance, investigation and prevention of zoonosis
- 3) Increase in the number of research projects and researchers on zoonoses
- 4) The population at risk are sensitized on zoonotic risks as well as on methods of avoiding them; likewise, a mass communication plan is instituted

4.3.4. DESCRIPTION OF ACTIVITIES

This component has four objectives and these are divided into activities

- 👉 **Objective I:** Integrate the “One Health” approach in training program at all levels (pre-university, university and Post University)

Activities

- 1) Lobby decision makers so that teaching on the “One Health” approach and on zoonoses are incorporated at the primary, secondary, university and post university levels.
- 2) At the primary school level, introduce the “One Health” approach in courses on hygiene; likewise common zoonoses should be included in biology and geography courses at this level¹².
- 3) Train community and group leaders¹³ on the “One Health” approach as well as on zoonoses transmission and prevention methods.
- 4) As concerns professional training, integrate the “One Health” approach in professional schools (forestry, wildlife, public health, veterinary schools etc); courses on food hygiene, zoonoses, human and environmental health should be taught in this light.
- 5) refresher courses :
 - Courses in Public Health Schools should be conceived and taught in accordance with the “one health” approach.

¹² Drawing inspiration on training in the preservation of biodiversity in the schools of the villages around the MEFOU Park or around the Zoological Garden in LIMBE, where school children receive on a voluntary basis, free lectures on conservation

¹³ Veterinary and medical assistants can educate and sensitize exposed populations on the risks of zoonoses and on preventative measures. Various extension workers (official and private) community leaders and especially teachers have important roles to educate the people on transmission and spread of zoonosis and on preventative measures.

- Training should match up with advances in science and technology for optimum preservation of ecosystem health.

5) University education :

- Offer courses on zoonoses, epidemiology, one health approach etc at the first degree level for biological sciences
 - Post graduate studies
 - Develop masters degree programs on Public Health and Environmental Risk or Hygiene, Public Health and Environment, Public Health and Surveillance of Zoonoses¹⁴
 - Facilitate the participation of nationals in international courses on public health etc so as to enhance their knowledge-base, recognition and competitiveness¹⁵.
- 6) Promote post graduate research on the ‘One Health’ concept and on zoonoses
 - 7) Reinforce the capacity of diagnosticians in universities on the diagnosis of important zoonoses¹⁶.
 - 8) Develop a working platform with universities for the training of trainees.
 - 9) Set up a library for publication and reports on zoonoses as well as on the “one health” approach
 - 10) Put national university researchers in a network and together with partner universities, initiate distance learning courses in public health
 - 11) Establish cooperation between national and foreign universities with staff/researchers (including sociologists, anthropologists, diagnosticians etc) of partner universities in direct contact or networking on the “one health” approach.

👉 **Objective 2 :Train stakeholders in animal (domestic and wild), environmental and human health on integrated surveillance and prevention of zoonoses**

Activities

- 1) Train and recycle in an inter-sectoral framework, focal points of surveillance, personnel of human ,environmental and animal health, the personnel at sentinel sites, personnel at frontier sanitary posts (wildlife, health) on surveillance, investigation and prevention of zoonoses
- 2) Improve capacities on veterinary sanitary inspection and on sample collection by technician during veterinary sanitary inspection
- 3) Organize refresher courses for biologists, diagnosticians and veterinarians in private practice on samples collection, marshalling and analysis.
- 4) Ensure that diagnosticians have specialized training on zoonoses

¹⁴ It is important that in medical/ veterinary training schools, ecologists, biologists’ anthropologists, agronomists etc give joint public health lectures on epidemiology, control of zoonosis and protection of the environment within the “one health” context.

¹⁵ International cooperation can play a determining role in achieving these activities of the Program

¹⁶ These labs will operate through networking as envisaged in the research component

- 5) Improve capacity on the management of surveillance data
- 6) Train data managers on use of computers and specialized programs.
- 7) Train members of community based associations such as; community based surveillance volunteers (VSBC); common initiative group (CIG), sanitary defense groups (GDS). Agro-pastoral promoters, conservators, eco-guards and other stakeholders integrated surveillance and control of epidemics or epizootics

👉 **Objective 3: Train Research Stakeholders On Zoonoses**

Activities

- 1) Train stakeholders on detection, epidemio-surveillances and prevention of zoonoses
- 2) Improve knowledge on sample-taking techniques, capture, labeling, sample collection, packaging, transportation and diagnosis of important zoonoses.

👉 **Ojective4 : Promote behavioral changes within communities and populations at risk**

Activities

- 1) Sensitize the population on the necessity of taking precaution during manipulation of bust meat and risky products
- 2) Sensitize authorities on different risks areas
- 3) Organize educational talks with young school children and women living close to protected parks or areas or in risky zones
- 4) Train local animators of management communities of cynegetic interest zones (ZCI) and of community management cynegetic interest zones (ZICGC)
- 5) Organize and support populations living around protected parks with agro-salvo –pastoral activities
- 6) Re-convert poachers into hunters guides, village animators etc
- 7) Sensitize professional on the risks of zoonoses as well as on their roles in preventing or fighting against zoonoses
- 8) Always inform and sensitize stakeholders and the general population on government actions
- 9) Establish an appropriate education, information and sensitization (communication plan) plan for the population

V. IMPLEMENTATION STRATEGY

Zoonosis is a public health problem in Cameroon; its importance was highlighted with the outbreaks of HPAI H5N1 in Cameroon in 2006. In addition, numerous factors such as risky behavioral patterns together with the geographical position of the country in the Congo Basin expose it to emerging and re-emerging zoonotic pathogens. The implementation strategy of NPPFERZ represents Government’s response to these threats; it also ties with the national strategy promoting the “one health” approach. Consequently, NPPFERZ is an essential tool for the implementation of the “one health” approach in Cameroon.

This strategy is in accordance with the national framework document on growth and employment in the country (MINEPAT, DSCE, 2009). It also ties with the financial and political orientations of the country to the horizon 2035. Based on past and present experiences and dispositions, the first phase of NPPFERZ is earmarked for a period of six years.

This being the case, the implementation strategy of the present program is supported on basic principles or concepts by an organizational and functioning method adapted to the environment and inspired by similar experiences elsewhere

5.1. BASIS OF THE STRATEGY

The implementation strategy of this program

- lies on the following:

The strategic document for growth and employment in Cameroon; in this document the government hopes to improve the health of populations through a global approach axed on integrated and systemic research that foster inter-sectoral synergies; bedrock for the successful realization of the health sector plan

The program is a tool which promotes the one health approach amongst professionals of animal health, human health and environmental health. This approach is developed in the national strategic document on one health. (Health approach 9 see illustration below)



DIAGRAM 2: NATIONAL STRATEGIC APPROACH ON “ONE HEALTH”

Commentaries on the illustration

From this illustration we clearly see that:

- 1) The National Strategy is at the nucleus of a whole range of satellite projects and program which are its instruments.
 - 2) The National Program for the Prevention and Fight against Zoonoses (NPPFERZ) is Government's coordinated response against these challenges.
- 👉 The implementation of the program depends on seven (07) key ministerial departmental namely: MINEPIA; MINSANTE; MINFOF; MINEPDED; MINRES; MINESUP; MINATD; MINCOM and MINTOUR.
 - 👉 The program does not come to create a new surveillance system on the contrary it comes to reinforce and promote integration of surveillance, investigation and prevention systems in animal, human and environmental health.
 - 👉 Information management system as concerns surveillance, investigation and prevention of zoonoses should be thorough within each particular sector, being in consonance with the Program. Such is the responsibility of each concerned Ministerial Department who should ensure that its other partners are also in conformity thus ensuring that the country is not wanting in any matters concerning emerging and reemerging zoonoses.
 - 👉 The program is axed on the prompt identification and prompt elimination of dangerous pathogens within animal hosts prior to their becoming threats to public health
 - 👉 The roles of various partners or sectors in the Program are in relation to their mission, technical and professional competences. In this light, every key player or stakeholder (sector) has to elaborate its activities with relevant budgetary allocations within the context of the Program.
 - 👉 While reinforcing inter-sectoral collaboration, NPPFERZ ties with all legal and regulatory frameworks with regards to the prevention and fight against emerging and reemerging zoonoses.
 - 👉 All the activities developed and executed in the framework of this Program will be financed and executed only if they guarantee the promotion of the "One Health" concept as well as respect its inter-sectoral dispositions.

5.2. ORGANISATION OF THE PROGRAM

The institutional basis of the program depends on three principal organs namely:

- 👉 The Steering committee
- 👉 The Technical-orientation committee
- 👉 The National Coordination

The functioning of the Program depends on these three afore mentioned organs.

5.2.1 The Steering Committee

5.2.1.1 Composition

The steering committee (COFIL) is made up as follows:

President : The Prime Minister, Head of Government;

Members

- The Minister of Livestock, Fisheries and Animal Industries
- The Minister of Public Health
- The Minister of Forestry and Wildlife
- The Minister of Environment ,Nature Protection and Sustainable Development
- The Minister of Territorial Administration and Decentralization
- The Minister of Scientific Research and Innovation
- The minister of Finance
- The Minister of Higher Education
- The Minister of Economy and Planification
- The Minister of Communication
- The Minister of Tourism
- Technical and Financial Partners

5.2.1.2 ROLES AND RESPONSIBILITIES¹⁷

- 👉 The Steering Committee is in charge of the National Strategy on one health; consequently she oversees all projects and programs that enhance the one health approach within its national framework.
- 👉 The steering committee (COFIL) is place under the authority of the Prime Minister, Head of Government who assures the effective implementation of the Program.
- 👉 The steering committee is responsible for promoting the one health approach and for policy orientation ensuring that NPPFERZ is successfully implanted as an essential structure for the preservation of ecosystem health in Cameroon.
- 👉 Projects and programs fostering the “one health” approach are endorsed and eventually evaluated by the steering committee.
- 👉 Interpretation and Directives on the one health strategy by the steering committee constitute the way forward
- 👉 The steering committee meets at least twice a year
- 👉 The chairman of the Technical Orientation Committee is appointed by the steering committee who also defines duties and responsibilities

¹⁷ Other roles and responsibilities could be clarified in the Acts of creation and organization

- 👉 The steering committee appreciates and approves the report of activities of NPPFERZ as presented by its chairman

The Prime Minister can invite, based on the issues been treated, any person or institution to participate in a non-deliberative manner at the Steering Committee's meetings. The secretariat of the steering committee is assured by the chairman of the technical orientation committee. The composition of the steering committee is acknowledged by an Act of the Prime Minister. Other operational modalities of the Steering Committee are defined and contained in relevant documents of the Program.

5.2.2 The Technical Orientation Committee

5.2.2.1 . COMPOSITION

It is made up of:

- 👉 The Technical Directors of all the concerned Ministerial Departments
- 👉 One representative from each of the following National Orders; Medical Doctors, Veterinary Doctors and Pharmacists.
- 👉 One representative from the civil society
- 👉 One representative of hunters guide
- 👉 The Technical Orientation Committee is assisted by a Scientific Committee that is co-presided by the Ministry of Scientific Research and Innovation and the Ministry of Higher Education; other members of the committee are drawn from MINEPIA, MINSANTE, MIFOOF and MINEPDED. Members of the Technical Committee, who must be distinguished scientists, have the responsibilities of providing sound technical knowledge and opinions for the successful and smooth running of the Program.

The composition of the Technical Committee as well as of the Scientific Commission is acknowledged by a decision of the Minister of Livestock, Fisheries and Animal Industries.

5.2.2.2 ROLES AND RESPONSIBILITIES

- 👉 The Technical Committee is presided over by one of its members selected from representatives of one of these four Ministerial Departments; MINEPIA, MISANTE, MINRES and MINFOF. Other options proposed for chairing the Technical Committee includes; a revolving presidency; a co-presidency; a president with three vice presidents. Decisions arrived at by the Technical Committee are based on simple majority.
- 👉 The Technical Committee is the Technical Orientation Organ of the Program with responsibility to technically supervise and follow up the activities of the Program
- 👉 The Technical Committee is responsible for:
 - The technical orientation of the program
 - The supervision of the activities of the program
 - Validates the budget of the program

- Elaborates appropriate projects for implementation
- Follows up the implementation of the program
- Ensures that strategic orientations and interpretation of the Program by the Steering Committee are appropriate executed;
- Ensures that recommendations tabled by the steering committee are put into application during the Program's implementation
- Executes all other tasks assigned to her by the steering committee

5.2.3. NATIONAL COORDINATION

5.2.3.1. Composition

In addition to the Permanent Secretary, the National Coordination includes;

- 👉 A monitoring and evaluation officer (SEE)
- 👉 An Internal Audit officer
- 👉 A Financial controller
- 👉 An accountant
- 👉 Support personnel

5.2.3.2. ROLES AND RESPONSIBILITIES

The National Coordination of the Program is under the auspices of a Permanent Secretary recruited through open bid by the Steering Committee. The recruitment of the Permanent Secretary is approved by a decision of the Minister of Livestock, Fisheries and Animal Industries following endorsement by the Steering Committee (COFIL)

- 👉 The National Coordination is responsible for programming, executing and coordinating all activities of the Program
- 👉 She is also in charge of administrative and financial monitoring and evaluation of the program's activities through the personnel of her monitoring and evaluation (S&E) Unit.
- 👉 Her mission shall be fully determined by contracts that include job descriptions (c.f. annexes)
- 👉 The recruitment modalities of the Permanent Secretary are as follows:
 - The Technical Orientation Committee outlines the term of reference as well as the required profile for potential applicants
 - The Minister of Livestock, Fisheries and Animal Industries publishes the recruitment announcement
 - The Technical Orientation Committee proceeds to select three (3) candidates as well as presents a report on the selection process.

- The personal documents of each of the preselected candidate together with minutes drawn-up during the pre-selection process and signed by at least 2/3 of its members are forwarded to the Minister of MINEPIA who transmits them to the Steering Committee.
- The Steering Committee (COFIL) takes the final decision on the retained candidate; she then authorize the Minister of Livestock ,Fisheries and Animal Industries to make public the final recruitment of the candidate through a Ministerial Decision
- The mandate of the Permanent Secretary is three (3) years renewable once.

5.2.4. THE COMPONENTS

The three components of NPPFERZ represent its operational arms. Each component is placed under a Unit Head that is responsible for technical coordination of relevant activities. Unit Heads are recruited under conditions defined by COFIL and are charged with the implementation of activities contained in the framework papers of the component. The composition and functioning of each component are defined in the basic documents of the Program.

5.2.5. NATIONAL AND LOCAL FOCAL POINTS (PF)

Within all Ministerial Departments directly involved in the implementation of NPPFERZ are:

- ↳ A National Focal Point (PFN)
- ↳ Regional Focal Points (PFR)
- ↳ Divisional Focal Points(PFD)

The organization and functioning of focal points (PF) at various levels within each Ministerial Department reflects the degree of organization and functioning of its epidemio-surveillance network. .

The designation and appointment of Focal Points within each Ministerial Department is by a Decision of the Minister in charge of the Ministry. The illustration below highlights this organizational structure.

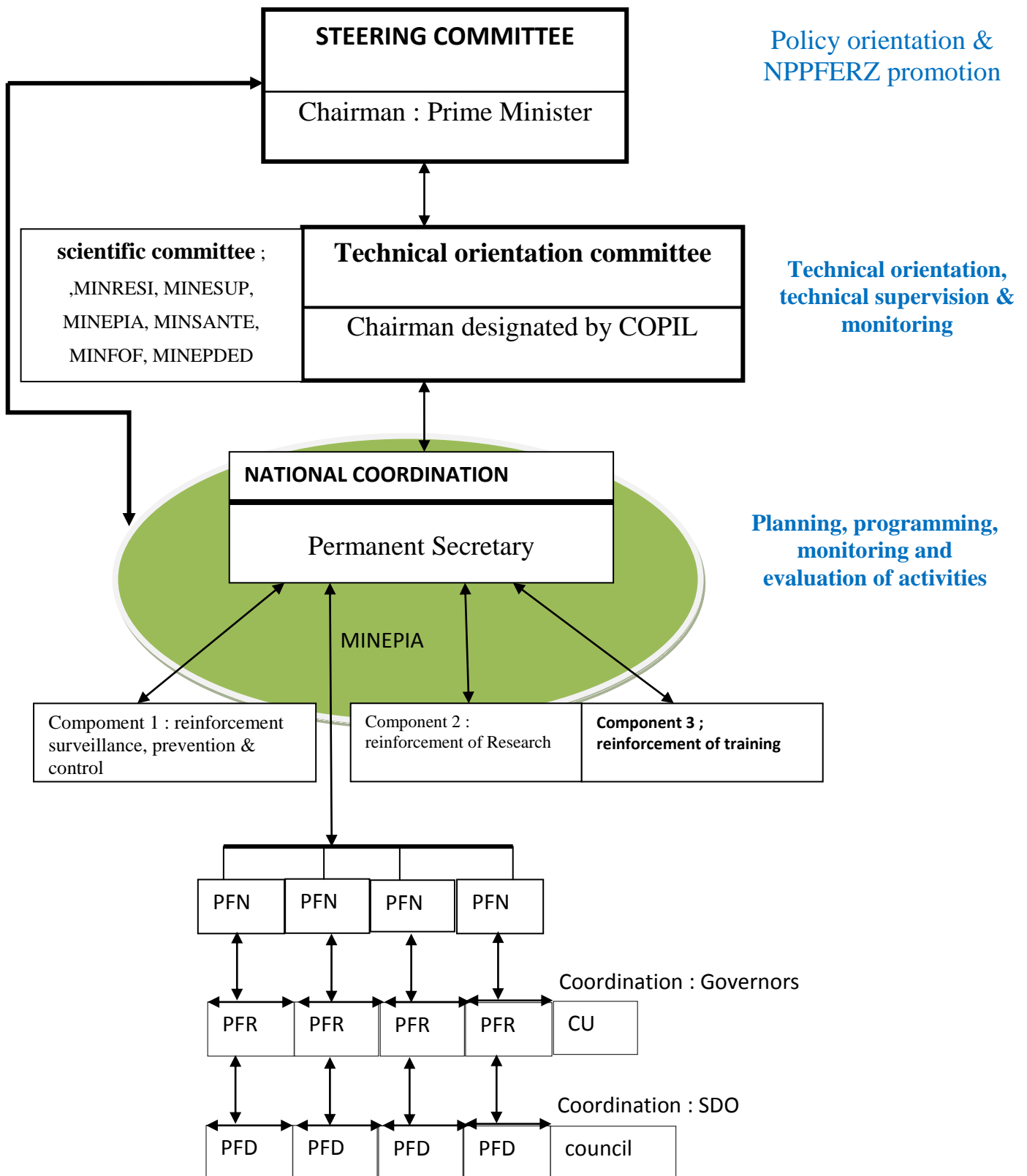


DIAGRAM 3: ORGANIZATION OF PROGRAM

5.3. COORDINATION FRAMEWORK

Coordinating the activities of NPPFERZ depends on two complementary mechanisms namely:

- An intra-sectoral mechanism
- An inter-sectoral mechanism

5.3.1 INTRA-SECTORAL MECHANISM

This entails vertical organization of the epidemio-surveillance system within a Ministerial Department. Here, it involves vertical organization inside the epidemic-surveillance system within a ministerial department. It characterizes the quality of relation amongst staff involved in epidemio-surveillance.

Consequently, it is necessary that each Ministerial Department officially designates its focal points at all levels. Each National focal Point is responsible for coordinating information and data management on NPPFERZ within his/her Ministry thus permitting reinforcement of epidemiological surveillance within every structure. On this basis, and for efficient and effective inter-sectoral coordination, it is important that every Ministerial Department markedly improves on its epidemio-surveillance system.

5.3.2 INTER-SECTORAL COORDINATION MECHANISM

NPPFERZ is coordinated by the Permanent Secretariat; and as described below, it is based on three strategic components or technical units. The Permanent Secretary in addition to coordinating all the activities of the Program thanks to assistance from the Technical Units, hence its day to day running as well as seeing to it that the aspirations of stakeholders are top priority, also represents the Program in time and space. The Permanent Secretary also carries out other duties that the Steering Committee may occasionally assign to him/her.

5.3.2.1 INTERNAL COMMUNICATION WITHIN THE COORDINATION

The main channels of communication within the coordination are; notices, instructions and meetings. Coordination meetings summoned and chaired by the Permanent Secretary will be held at least once every month and whenever necessary within the structures of the permanent secretariat. It is worth noting that these meetings are great occasions permitting thorough review of various aspects of NPPFERZ (programming, state of execution, monitoring reports etc).

In addition to the Permanent Secretary, the following are participants to the monthly coordination meetings; leaders of the three components, national focal points of the following ministerial departments MINEPIA, MINSANTE, MINFOF, MINEPDED.

Based on the agenda of the meeting, the Permanent Secretary may invite anybody with appropriate background. The minutes of the meeting taken by an assistant of the Permanent Secretary and endorsed by him, are dispatched to all participants within 24 hours after every sitting.

Minutes of all other meetings (internal or external) must be submitted for endorsement by the Permanent Secretary prior to its dispatching to participants.

5.3.2.2 Communication between focal points

Communication between focal points is both vertical and horizontal either through notices, instructions or meetings. Within Regions and Divisions, focal points of the concerned Ministerial Departments, alongside representatives of various councils, respectively hold coordination and evaluation meetings one and two weeks prior to the date for the national meeting. In crisis situation, several meetings can be held following convocation by the Governor or Prefect.

Minutes of meetings are taken down by the various focal points on a rotative basis. These minutes must be dispatched to all participants within 24 hours post sitting, after validation by the Regional or Divisional Coordinator of the network of focal points.

The minutes are subsequently transmitted within 72 hours to the various Ministerial Departments and to the Steering Committee. Regional and Divisional coordination meetings are respectively chaired by the competent Governor or Prefect (SDO) who is also responsible for deciding the venue of the meeting.

Councils are statutory members of coordination meetings at divisional and regional levels.

5.3.3 SPECIFIC TASKS OF THE COORDINATION

- 👉 Supervise the daily execution of the program
- 👉 Coordinate all the activities of the program in concertation with the heads of the different components and national focal points
- 👉 Ensures thorough monitoring and evaluation of all activities of the Program
- 👉 Prepare annual work plan and budget proposals with the assistance of the different component heads.
- 👉 Takes care of secretariat activities during meetings;
- 👉 Give out tender bids and authorize payments for transactions under his competence
- 👉 Look for sources of financing
- 👉 Do lobbying for the program
- 👉 Promote transparency and understanding of the program
- 👉 Assure the daily functioning of the Program
- 👉 Manage the Program personnel
- 👉 Manage the property of the Program
- 👉 Authorize financial transactions (fund withdrawal etc)
- 👉 Execute missions assigned to it by the Steering Committee
- 👉 Write out trimester and annual activity reports
- 👉 Write out the various reports (trimester and annual reports etc) on the activities and functioning of the Program and distribute them to stakeholders as stipulated.
- 👉 Coordinate relation with the different partners of the Program
- 👉 Program and accompany audit missions of the Program
- 👉 Relates with sponsors in the context of the Program and in conformity with guidelines established by the Technical Orientation Committee.

5.3.4 PERSONNEL OF THE COORDINATION

Beside the Permanent Secretary, the coordination of the program also includes:

- 👉 The monitoring and evaluation officer(R.S.E)
- 👉 An internal audit officer
- 👉 A specialist in tender bids (SPM)

- ↳ A financial controller
- ↳ An accountant
- ↳ auxiliary staff

Auxiliary staff includes; secretaries, drivers, security agents, and other administrative support staff whose job description must have been approved by the technical orientation committee, within the availability of funds.

5.4. MOBILISATION OF RESOURCES

Setting up the Program is subjected to the availability of resources. Two sources have been identified for the financing of NPPFERZ and these are:

- ↳ The Public Investment Budget (BTP)
- ↳ Technical and Financial assistance from Partners(PTF)

On this basis, NPPFERZ will be financed through “a common fund” receiving financial allocation from the above sources. An account to this effect will be established in BEAC under the name of the Coordination.

5.5 MECHANISM FOR MOBILISING RESOURCES

5.5.1. AT THE LEVEL OF GOVERNMENT

All Ministerial Departments directly concerned with NPPFERZ must include in their “Road Map” activities relevant to the Program. These activities will be programmed into annual, bi-annual and tri-annual sub-activities; accompanying budget to these is subsequently transferred by each Ministerial Department into the “common fund” under the auspices of the National Coordination of NPPFERZ.

Meanwhile, each directly concerned Ministerial Department is responsible for financing other relevant (non-transversal) activities that falls within its competence.

The budget of his Program’s coordination is elaborated by the Permanent Secretary, validated by the Technical Committee and defended by MINEPIA.

Each Ministerial Department makes relevant financial transfer into the “common fund” through a Ministerial Decision and on the principle of “Avant-projet d’Execution” (APE) that makes for easy mobilization of financial resources.

The Permanent Secretary is the “vote holder”; consequently the manager of the “common fund”. However all engagements must follow the “APE” principle once validated by the Technical Committee.

5.5.2 AT THE LEVEL OF FOREIGN SPONSORS (PARTNERS)

A major principle of the Program is that it finances activities and not structures. Consequently one or several approved activities will be grouped to constitute a project which will subsequently be presented to potential sponsors for funding.

5.5.3 Mechanism of Funds Management

- ☞ Generally, management of NPPFERZ funds follows the normal Public Expenditure procedure and to this effect, a finance controller and an accountant shall be appointed to the program in a bid to guarantee accountability in the management of the “common fund”.
- ☞ With regards to funds from Partners, financial procedure will be in accordance with “Technical Partners Financing” (PTF). However and depending on the activities to be financed, sponsors may choose to deposit their fund into a commercial bank; and in such a case, procedures enabling the disbursement of such funds are clearly stipulated in the Financial Agreement.
- ☞ In the case where the financing needs government’s co-financing, MINEPIA or the supervisory authority shall be responsible for its inclusion into the state budget as well as its disbursement for the benefit of the particular project of NPPFERZ.
- ☞ One of the top priorities once NPPFERZ takes off is the putting into place of a Field Operation Manual by the Technical Committee.

5.5.4 Non exhaustive list of potential sponsors (donors)

The list below without being exhaustive gives an idea of potential donors from whom the Program can solicit technical and financial support in order to carry out her activities

☞ At the national level

- The State budget
- The special fund for the development of Wildlife
- Fund for the management of catastrophes (MINADT)
- PMUC (race funds)
- Foundation –MTN, ORANGE, Brasseries, Kadji
- Competitive Basis Research Fund (CD2)
- CDEN-CDENO.CDPM
- IMPM
- CREMER/PRESSICA

☞ In Africa

- CEMAC/CEEAC
- BAD
- CEBE VIRHA
- OCEAC
- CARPE
- AU-IBAR
- AU-PANVAC
- NEPAD-CAADP

☞ At the international level

- Embassies
- USAID, USFWS, USDA
- DFID
- UE
- CDC

☞ Technical Cooperation

- French, Japanese, SNV, GTZ
- WHO, UNDP, FAO, OIE, UICN
- World Bank
- Islamic Development Bank
- KFW
- WWF, WCS, UICN
- Foundations (Bill and Melinda Gates Foundation; Clinton Foundation Carter's Foundation etc)

5.6. MONITORING AND EVALUATION (S&E)

To realize the general and specific objectives of the Program and its Components, thorough monitoring and evaluation based on well define timelines and realistic indicators is the way forward.

This will among other things permit executing bodies to set-up and strengthen monitoring and evaluation of their performances, taken stock of progress made, difficulties encountered with regards to implementation of the project as well as ameliorating proposals for the way forward.

During implementation, the activities of the Program will be divided into sub-activities with appropriate monitoring and evaluation indicators (i.e. technical, financial and impact indicators).

To permit better monitoring and evaluation, a performance-indicator manual will be established in line with new orientations axed on result-based management. This manual will make it possible to have good accountable technical and financial reports of activities of the Program.

5.6.1 Monitoring

- ☞ Monitoring the activities of the program will be by the coordination and the concerned component. Thus within each component and with the assistance of the coordination, appropriate monitoring tools will be developed. On this basis, reports from different focal points are key monitoring tools.
- ☞ As concerns monitoring by the Government, Donors Beneficiaries, the coordination shall trimestrially provide activity reports which must be produced latest 30days after the end of the period in consideration.
- ☞ The activity reports shall show the Programs achievements during the period under consideration. They will also provide information on the following :

- Administration
- The state of advancement of activities
- The Coordination's performances programmed (Number of meetings programmed and held, number of supervisory missions, deadline for payments ,deadline for market bids etc)
- The financial situation of the project (engagement, disbursement etc)
- Performance indicators and field operation manuals of the Program.
- Trimestrial reports shall be regularly presented by component heads and by national focal points during a meeting scheduled by the coordination.

5.6.2. EVALUATION

The Program's implementation is segmented into budget-tied phases of execution. The execution phase of the program is divided into phases in line with the budget. Hence the Program's evaluation has 5 main stages :

- 👉 initial evaluation
- 👉 Annual internal evaluations
- 👉 Mid-term evaluation
- 👉 End of phase evaluation
- 👉 Internal audit and control

5.6.2.1. Initial Evaluation

Evaluation enabling establishment of the Program's data base

5.6.2.2 Annual internal evaluation

This is carried out by the coordination and consists of;

- 👉 Establish the physical achievements of the year's activities in relation to the annual work program; throw light and explain the discrepancy between planned and executed work.
- 👉 Present a cash-flow analysis on funds allocated to the Program and on all financial transactions within the budgetary year.
- 👉 Sum up and approve financial and other reports destined to donors.
- 👉 Establish a calendar for annual external audits (technical and financial)
- 👉 Examine and approve the plan for contract bids for the following year

5.6.2.3. Mid-term Evaluation

Led by the coordination, mid-term evaluation covers all aspects of the Program for the period under review and entails;

- 👉 Measuring the project performance in relation to baseline data and objectives

- 👉 Taking note of the technical, physical and financial achievements during the first phase
- 👉 Redefining or adjusting performance in relation to the data base and objectives
- 👉 Describing the technical physical and financial aspects during the first phase.
- 👉 Doing the necessary financial re-allocation and readjustments
- 👉 Doing the necessary restructuring and reallocation of funds
- 👉 Doing the necessary organizational and institutional adjustments
- 👉 Carrying out necessary modifications of Program's reference documents c.f. various manuals

5.6.2.4 END OF PHASE EVALUATION

At the end of a phase and prior to closing the activities of the period concerned, Government together with the Development Partners involved, request an independent evaluation of the execution phase and results of the Program so far.

5.6.2.5 Internal Audit and Control

- 👉 This entails a series of verification processes, initiated in order to reassure on the one hand that the program's resources are used following the defined objectives and procedures; and on the other hand that the physical results are qualitatively and quantitatively in conformity to the resources allocated for it.
- 👉 The control is carried out internally by an official of the internal audit and externally by institutions or persons so mandated
- 👉 It mainly involves the application of processes or procedures involved in transactions such as; contract awards, financial transactions and engagements, accounts and accounting procedures, physical assets, institutional operations etc.

Meanwhile, thorough verification procedures (technical, financial, administrative) are carried out to ensure that the program's execution is in accordance with laid down procedures and recommendations of the steering committee and/or the various audit and control missions. Strict verification also ensures that the checks put in place are regularly done thus inhibiting unauthorized adjustments or deviations of the activities of the project or program.

5.7. BENEFICIARIES OF THE PROGRAM

The principal beneficiaries of the Program are the general population as its successful implementation frees them and their animal-environment-based livelihoods from the burden of zoonotic diseases. Based on the DSCE document, NPPFERZ is one of the key harbingers enabling Government to attain its health sector policy within the framework of the inter-sectorial, multidisciplinary "one health" approach. Thus ministerial departments directly involved in its implementation also stand to gain tremendously.

5.7.1 Priority Ministerial Departments gaining directly from NPPFERZ

These are; MINEPIA, MINSANTE, MINFOF, MINEPYED, MINESUP, MINEFOP, MINESEC, MINEDUB, and MINRESI

- 👉 The disease surveillance, investigation and prevention networks of MINSANTE and MINEPIA shall be reinforced such that they are better able to undertake epidemiological surveillance of emerging and reemerging zoonoses. A well equipped inter-sectoral “sanitary watchdog” bureau shall be created.
- 👉 All will be done to see to it that staff of concerned Ministerial Departments acquire necessary skills as well as work in a multi-sectoral, synergistic and collaborative spirit.
- 👉 Key stakeholders will acquire the necessary technical competence permitting their thorough understanding and application of the “one health” approach in the fight against zoonoses.
- 👉 In accordance with OIE standards, a new national laboratory (independent of LANAVET) capable of analyzing samples of major emerging and reemerging zoonoses will be constructed.
- 👉 Workers of MINEPIA, MINFOF, and MINSANTE will be better equipped against occupational zoonoses.
- 👉 MINRESI and MINESUP will benefit from inter-university and Research cooperation (equipment, training etc)

5.7.2 RURAL POPULATION

The first beneficiaries to this program are rural populations notably those living near the National reserves or parks (poachers, hunters, handlers of bush meat, consumers etc) through job creation, reduced exposure etc.

- 👉 Job opportunities especially for extension workers as sensitizers of the general population on the risk of emerging and reemerging zoonoses (retrained former poachers will be best suited)
- 👉 Sensitization of population will result in positive behavioral change hence reduce the exposure of people to the risks of infection from emerging or reemerging zoonotic pathogens.

5.7.3. Staff of MINEPIA and MINFOF

Notably, staff in regular contact with animals as they carry out their professional obligations. It is worth noting that the technical skills of staff of these ministerial departments involved in NPPFERZ will be markedly upgraded especially as concerns the collection and conservation of wildlife data.

At least one hundred and twenty (120) state agents of Ministerial Departments and NGOs directly concerned with the program will in addition to other benefits (training/capacity building) reap some financial reward.

5.7.4 VISITORS TO PROTECTED PARKS

Tourists, researchers, students, associations etc

5.8. RISKS AND CONSTRAINTS

5.8.1 RISKS

- 1) NPPFERZ is established in a complex and difficult context (institutional, environmental, structural etc). Key implementing actors come from different backgrounds (animal, human and environmental health), often with different training, views, interests or motivation.
- 2) This program is built on the experiences gained from past programs especially the Integrated National Program for the Prevention and Fight against Avian Influenza. A proper appreciation of the strengths and weaknesses of such programs permits the building of NPPFERZ on a solid foundation.
- 3) The gains of the Program against Avian Influenza even though significant remain wanting necessitating our being proactive thus justifying the creation of NPPFERZ, else we may be overwhelmed by future emerging and reemerging epidemics or epizootics of zoonotic diseases. The risk here is for us to think that knowledge gained during the Avian Influenza, Common Fund Project is adequate for us to efficiently manage an emerging or reemerging zoonotic disease crisis situation.
- 4) One of the key indicators and success of the program is behavioral change especially by targeted populations. For such change to be sustainable, clear and better alternatives to the way of lives and livelihood of these populations have to be provided
- 5) Socio cultural practices such as widow hood rituals, traditional autopsies or exhuming of corpses etc are still discreetly occurring in certain areas of the country despite Government's prohibition, and constitute de facto risk factors in the propagation of zoonotic diseases.
- 6) Preventative measures currently in place against certain public health threats like rabies, cholera etc still overwhelmingly rely on the administration that often are an extra burden (additional cost) and hindrance to rapid intervention by technicians. Administrative involvement in NPPFERZ is markedly reduced so as to put in check these drawbacks.
- 7) Added to the risks are leadership conflicts in the management of Programs and Projects which habitually take place in Cameroon .It is thus hoped that the present program framework makes the necessary arrangements so as to clearly define the roles and responsibilities of the different sectors and that of the workers in order to avoid unnecessary conflicts.

5.8.2. CONSTRAINTS

- 1) One of the constraints the Program shall face is the enclavement of most rural zones as well as the potential risk of emerging zoonoses. Most villages and hunters' huts are found in extremely remote areas which are at times inaccessible to vehicles especially during the rainy season. Delay by veterinary or human health workers in intervening with appropriate measures gives room to traditional healers to take over. De-motivation of community workers and the local leadership (village heads etc) in the prevention and fight against zoonoses could markedly disrupt the expected results and positive impact of the Program.
- 2) Another important constraint is the collection, conservation and marshalling of appropriate samples and information to the center of analysis or exploitation.

Collaboration with lugging companies and NGOs will help in sample conservation (in situ using various refrigerating facilities) and marshalling¹⁸.

- 3) At the human level, we have problems of hygiene at both the individual, and community levels. Practices such as cohabitation with domestic animals (sheep, goats, pigs, poultry etc) as well as infestation of domiciles by rats and mice are serious challenges.
- 4) Lack of funds or delay in the disbursement of funds is a potential constraint. Likewise personnel deployment by concerned ministries often do not pay attention to Program or project's specification, staff professional training and experiences and these are potential challenges to the success of NPPFERZ.

5.9. CHRONOGRAM OF THE PROGRAM

Being a strategic document, the tentative chronogram besides being futuristic must be based on achievable goals. What we present here is a guideline on priority activities upon which the Technical Orientation Committee will build so as to establish a realizable chronogram with timelines and verifiable indicators once NPPFERZ takeoff.

The activities proposed for 2012 are:

- ↳ Institutional set up
- ↳ Sensitization

INSTITUTIONAL SET UP

This consist of :

- ↳ Setting up the organs of NPPFERZ (COFIL, Technical Committee) through various Government Acts (Arête/ Decision) of the Prime Minister, Head of Government.
- ↳ Elaboration and publication of texts relating to the creation and organization of the Program by a decree of the Prime Minister, Head of Government.
- ↳ Decision by MINEPIA, creating and instituting the Technical and Orientation Committee.
- ↳ Recruitment of staff of the coordination, (elaboration of terms of reference, job description, required profile of applicants to various positions, documents to be compiled for recruitment, Recruitment Announcement etc)
- ↳ Publication of Decisions from concerned Ministerial Departments designating their National, Regional and Divisional Focal Points.
- ↳ Publication by joint Decisions/texts, designating and instituting Regional and Divisional Coordination Committees of Focal Points(coordinators, members) as well as their functioning modalities.
- ↳ Elaboration and institution of the Program's administrative and financial procedures.
- ↳ Ameliorating and institutionalizing existing surveillance systems or putting in place necessary surveillance systems.

¹⁸ Especially in forest zones

- 👉 Harmonization of surveillance systems as well as institutionalization of an inter-sectoral coordination of surveillance systems.
- 👉 Establish an operational plan of execution of the Program together with necessary budgetary allocations.

SENSITIZATION AND RETRAINING OF WORKERS AND COMMUNITIES

Sensitization activities include ;

- 👉 Simplify and widely distribute documents on the “One Health” strategy
- 👉 Prepare lobbying documents as well as communication plan
- 👉 Do intense lobbying of Decision Makers and Donors
- 👉 Carryout capacity building of staff involved in surveillance including those in communities
- 👉 Develop didactic materials for information and sensitization on zoonoses

5.10. COST ESTIMATE OF PROGRAM

TABLE 1: ESTIMATED COST AND CHRONOGRAMME OF PROGRAM

N°	Objective	Activities	Person in charge	Actors	Expected results	Cost in millions FCFA	Funding sources		Calender / annual cost	CHRONOGRAMME (A= year)				
										A1	A2	A3	A4	A5
1	COMPONENT 1 : REINFORCEMENT OF EPIDEMIO-SURVEILLANCE AND PREVENTION					6449			2012/2013					
1.1	Apply an inter-sectoral strategy for surveillance and prevention								X	X	X	X	X	
1.1.1		Elaborate and put in place common surveillance and prevention projects				30				X	X	X	X	X
1.1.2		Set up multi-sectoral committees on surveillance and prevention and ensure they are operational				402					X	X	X	X
1.1.3		Hold regular multi-sectoral committee meetings on surveillance and prevention at all levels				27				X	X	X	X	X
1.1.4		Organize joint investigation and monitoring meetings to the field				100					X	X	X	X
1.1.5		Put in place a network for sharing information on zoonoses				30					X	X	X	X
1.1.6		Establish a list of priority zoonoses				5				X				
1.2.	Apply early detection of cases								X	X	X	X	X	
1.2.1		Set up an inter-sectoral watchdog system at all levels				50					X	X	X	X
1.2.2		carryout surveys in view establishing a map of zoonotic risky areas				250					X		X	
1.2.3		Identify and establish sentinel sites				5				X				

1.2.4		Elaborate a technical log book on « case definition » of priority zoonoses				15				X	X				
1.2.5		Elaborate and apply surveillance protocols on zoonoses				<i>Included in 1.1.2 and 1.2.4</i>				X	X				
1.2.6		Enhance the capacities of veterinarians, hunters' guides, eco-guards and conservators on specific aspects of wildlife surveillance				50				X	X	X	X	X	
1.2.7		Train / recycle workers of health units, sentinel sites and frontier sanitary control posts on the application of surveillance, investigation and prevention protocols on zoonoses				50				X	X	X	X		
1.2.8		Set up the rapid alert procedure				<i>Included in 1.1.2</i>				X	X				
1.2.9		Develop and apply packaging, handling and transportation procedures for samples				10				X	X				
1.2.10		Elaborate and set up collaboration platform with regards to trans frontier surveillance				100				X	X				
1.3.	Ensure data collection and management at all levels										X	X	X	X	X
1.3.1		Set up a data base on zoonoses				<i>Included in 2.1.4</i>				X	X				
1.3.2		Train personnel on the use of data base				80				X	X	X	X	X	
1.3.3		Set up channels for the transmission of data				100				X	X				
1.3.4		Consult the data base				35				X	X	X	X	X	
1.3.5		Regularly produce and circulate information on zoonoses through bulletins				<i>Included in 1.1.5</i>				X	X	X	X	X	

1.3.6		Ensure information feedback at all levels									X	X	X	X		
1.4.	Enhance diagnostic capacities											X	X	X	X	X
1.4.1		Organize training sessions on sample collection techniques and analysis for diagnosticians, laboratory technicians and veterinarians in private practice				50					X	X	X	X	X	
1.4.2		Elaborate and apply standard operations procedure (SOP)				20					X	X	X	X	X	
1.4.3		Train lab diagnosticians on the application of surveillance and prevention protocols on zoonoses				20					X	X	X	X	X	
1.4.4		Evaluate and equip laboratories with sample collection and diagnostic materials				800					X	X	X	X	X	
1.4.5		Equip and train field staff on the utilization of rapid diagnostic kits				80					X	X	X			
1.4.6		Supply laboratories with necessary equipment, materials and logistics				<i>Included in 1.4.4</i>						X	X	X	X	
1.4.7		Bring national/reference laboratories through capacity building to international standards				500						X	X	X	X	
1.4.8		Set up a network for laboratories				20					X	X				
1.5.	Involve communities in surveillance activities											X	X	X	X	X
1.5.1		Work with communities in elaborating and setting up surveillance and prevention activities on zoonoses				100					X	X	X	X	X	
1.6.	Reduce risk exposure and transmission of zoonoses to human ; and from human to human											X	X	X	X	X

1.6.1		Set up a vaccination plan against rabies, brucellosis etc for all target groups				15				X	X			
1.6.2		Acquire and carry vaccines as well as other accessories to Regions				500				X	X	X	X	X
1.6.3		Upgrade human resources (trainers, supervisors, vaccinators social animators etc) at all levels				300				X	X	X	X	X
1.6.4		Sensitize populations on the risk they face following exposure or contact				50				X	X	X	X	X
1.6.5		Fight against poaching				20				X	X	X	X	X
1.6.6		Fight against stray dogs and free ranging domestic animals				50				X	X	X	X	X
1.6.7		Create and equip isolation / quarantine centres for patients in all Regions and frontier control posts and ensure that they are functional				200					X	X	X	
1.6.8		Ensure thorough veterinary sanitary inspection of foods of animal and halieutic origins, bush-meat etc				200				X	X	X	X	X
1.6.9		Elaborate and apply stamping-out procedures of infected animals or contaminated products with payment of appropriate financial compensation to proprietors				1000				X	X	X	X	X
1.6.10		Map out and segregate grazing areas from wildlife reserves in order to limit contacts between domestic animal s and wildlife				500					X	X	X	X
1.6.11		1 -Set up a preventative control system for persons at risk (reinforce surveillance at frontier control posts and at airports or seaports				100					X	X	X	X

1.6.12	2 -Elaborate and apply veterinary sanitary inspection measures for bush-meat and other wildlife products				50					X	X	X	X		
	3 -Reactivate municipal lock-ups for stray animals				120										
1.6.13	Construct quarantine stations at major entry points and see that they are functioning				500					X	X	X	X		
1.7.	Management of cases										X	X	X	X	X
1.7.1	Produce and circulate case management protocols				20					X	X				
1.7.2	Order and pre-position personal protection equipments (PPE)				150					X	X	X	X	X	
1.7.3	Constitute vaccine stocks				<i>Included in 1.6.2</i>						X	X	X	X	
1.7.4	Ensure the proper and free management of cases in isolation or quarantine centres				100							X	X	X	
1.7.5	Train staff (Doctors, nurses, diagnosticians etc) on the proper management of cases				20					X	X	X			
1.8.	Strengthen preventative capacities against zoonoses occurring in epidemic or epizootic proportions										X	X	X	X	X
1.8.1	Elaborate and set up contingency plans for emerging and reemerging zoonotic diseases				150					X	X				
1.8.2	Create mobile rapid intervention teams at all levels				250					X	X				
1.8.3	Carry out huge multi-sectoral simulation exercises				<i>Included in 1.8.1</i>					X	X				
2	COMPONENT 2 : REINFORCEMENT OF SCIENTIFIC RESEARCH ON ZOOSES				1380										
2.1.	Coordinate and structure research on zoonoses										X	X	X	X	X

2.1.1		Finalize the composition, attributions and functions of the committee responsible for issuing research authorization permits.				15				X	X			
2.1.2		Finalize the composition of a national ethics committee				20				X	X			
2.1.3		Revise and standardize research authorizations (ethical and administrative)				<i>Included in 2.1.1</i>				X	X	X	X	X
2.1.4		Compile and update publications ,data and reports on zoonoses in Cameroon				50				X	X	X	X	X
2.1.5		Set up and access system to publications, data and reports on zoonoses in Cameroon				30				X	X	X		
2.1.6		Create a directory of researchers on zoonoses				<i>Included in 1.1.5</i>				X	X			
2.1.7		Create a national network of researchers working on zoonoses in Cameroon with members linked through a website				10				X				
2.1.8		Create a national network of laboratories doing research on zoonoses in Cameroon				<i>Included in 1.4.8</i>				X	X			
2.1.9		Create a research platform on zoonoses in cameroon				10				X	X	X	X	X
2.2.	Set up a research framework on priority zoonoses									X	X	X		
2.2.1		Organize a national workshop for the concensual definition of priority zoonoses as well as programming relevant research activities				<i>Included in 1.1.6</i>				X				
2.3.	Strengthen human and infrastructural activities									X	X	X	X	X
2.3.1		Develop research themes on emerging and reemerging zoonoses based on the « one health » approach				<i>Included in 1.1.1</i>				X	X	X	X	

2.3.2		Support research institutions and universities in training activities on the detection, epidemiology prevention and pathogenicity of priority zoonotic diseases				150					X	X	X	X			
2.3.3		Carry out research on impact and perception of zoonoses including cost / benefit analysis of preventative measures				50				X	X	X	X	X			
2.3.4		Support professional and academic training				250				X	X	X	X	X			
2.3.5		Identify needs and provide well adapted equipment and materials to operational research structures				400				X	X	X	X	X			
2.4.	Identify new pathogens												X	X	X	X	X
2.4.1		Map out high risk sites for emerging pathogens				50				X	X						
2.4.2		Undertake epidemiological surveys				<i>Included in 1.4.4</i>				X	X	X	X	X			
2.4.3		Develop tools adapted for detecting new pathogens				150					X	X	X	X			
2.4.4		Analyse health risks				100				X	X	X	X	X			
2.4.5		Establish therapeutic protocols and monitor their efficacy				50				X	X	X	X	X			
2.4.6		Study resistance to anti-infectious agents									X	X	X	X			
2.4.7		Structure the different levels of biological analysis and then dispatch samples accordingly				10					X	X	X	X			
2.5	Identify risk factors favoring the propagation of zoonoses as well as determinants for behavioral change												X	X	X		
2.5.1		Carry out socio-behavioral, economic and anthropological surveys in relation to zoonoses				30				X	X						

2.5.2	Create geo-spatial models on infectious processes using ecological, epidemiological and socio-economic determinants				10				X	X			
2.6	Develop strategies on vaccine research								X	X	X		
2.6.1	Identify the different specific antigen types or subtypes in circulation				50					X	X	X	X
2.6.2	Carry out vaccine trials				50						X	X	X
2.7	Develop new technologies												
2.7.1	New sample collection techniques adapted and validated				20				X	X	X		
2.7.2	Develop an information system that enables the transfer of secured data in an inter-operational context (inter /intra Ministerial as well as inter network				<i>Included in 1.3.3</i>				X	X			
2.7.3	Set up new platforms for medical analysis				<i>Included in 1.1.4</i>				X	X			
2.8	Develop facilitating tools for Public Health decision Making								X	X	X	X	X
2.8.1	Carry out scientific and economic evaluation (studies) on the impact of preventative measures				50								
2.8.2	Create decision making facilitating models (i.e. spread and propagation of epidemics ; models that enable the testing of various public health policies ; models facilitating the detection of epidemics etc)				20				X	X	X	X	X
2.8.3	Evaluation of models used in public health management				50					X		X	
2.9	Set up a value added framework for research results												
2.9.1	Set up a legal framework for managing valuable discoveries				0				X	X			

3.2	Set up university network of research on the one health approach													
3.2.1		Develop Masters Program in Public Health and Environmental Risks ; or in Hygiene, Health and Environment ; or on Surveillance of Zoonoses ; integrating the 'one health' approach				200			Every 2 years		X	X		
3.2.2		Negotiate the participation of candidates to available international courses so that they can acquire and/or develop internationally recognized expertise in public health				250				X	X			
3.2.3		Promote post graduate research within the 'one health' context as well as on zoonoses				600				X	X	X	X	X
3.2.4		Improve the knowledge and know-how of technical staff in university laboratories in the diagnosis of priority zoonoses				50				X	X	X	X	X
3.2.5		Develop partnership with universities for the training of trainers				10								
3.2.6		Create a national network of university researchers and link them with those of partner universities ; introduce distance learning courses in public health				Included 3.2.2					X	X	X	X
3.2.7		Set up a library for publications and reports on zoonoses as well as one the 'one health' concept				50				X	X	X	X	X

3.2.8		Promote a framework of inter-university cooperation both at the national and international levels and put researchers / lecturers (including sociologists and anthropologists) and the labs of the said universities in networking in accordance with the one health concept				50				X	X	X	X	X	
3.2.9		Teach a course on zoonoses, epidemiology, prevention of zoonoses and the 'one health' approach at the degree level in biological sciences				Included in 1.1.4						X	X	X	
3.3	Train staff of animal health (domestic and wild animals) and human health on integrated surveillance and prevention of zoonoses										X	X	X	X	X
3.3.1		Train and recycle on an inter-sectoral framework - focal points involved in surveillance ; animal, human and environmental health staff ; sentinel and frontier control posts staff (health and wildlife), on surveillance, investigation and prevention of zoonoses				300				X	X	X	X	X	
3.3.2		Reinforce capacities of veterinary nurses and technicians in veterinary sanitary inspection as well as in collection of samples				150				X	X	X	X	X	
3.3.3		Organize training sessions to upgrade skills of diagnosticians (medical and veterinary) including veterinarians in private practice on techniques of sample collection and analysis				250				X	X	X	X	X	

3.3.4		Specialize diagnosticians in the area of zoonoses				<i>Included in 3.3.3</i>				X	X	X		
3.3.6		Improve skills of data managers in the utilization of various computing appliances and special software.				<i>Included in 1.3.1</i>				X	X	X	X	
3.3.7		Train community based surveillance volunteers (VSBC), common initiative groups, health defense groups (GDS), agro-pastoral promoters, conservators, eco-guards, members of inter-professional and women`s associations etc on the surveillance, prevention and control of zoonoses.				100				X	X	X	X	X
3.4	Train research workers on zoonoses													
3.4.1		Train research workers on detection, epidemio-surveillance and prevention of zoonoses				<i>Included 1.2.7</i>				X	X	X	X	X
3.4.2		Strengthen capacities in sampling techniques, capture, marking, sample collection, packaging, handling, marshalling and diagnosis of priority zoonoses.				50				X	X	X	X	X
3.5	Sensitize populations on the one health approach and promote behavioral changes within communities													
3.5.1		Sensitize populations on the need for the observance of strict precautionary measures when manipulating bush-meat and risky products				100				X	X	X	X	X
3.5.2		Sensitize authorities of different areas on risks				50				X	X	X		

		Organize education talks for youths and women living within the peripheries of national parks, reserves and other risky areas				50				X	X	X	X	X
3.5.3		Train local sensitizers of local management committees of Cynegetic zones of interest (ZIC) and those of cynegetic zones of interest with community management. (ZICGC)				20					X	X	X	X
3.5.4		Organize and support populations living within the peripheries of reserves or wildlife parks etc into agricultural, livestock and bee farming activities				40				X	X	X	X	X
3.5.5		Reconvert poachers, hunters' guides, pathfinders to sensitization agents of communities.				30					X	X	X	X
3.5.6		Sensitize professionals on zoonotic risks and on their critical roles in the prevention and fight against zoonoses				10				X	X	X	X	X
		Regularly inform stakeholders on measures taken by Government				10				X	X	X	X	X
		Elaborate a mass communication plan for the population and communities				200				X	X			
4	Coordination					200			Annually	X	X	X	X	X
TOTAL : Component 1 + Component 2 + Component + Coordination						12319								

TABLE 2: LOGICAL FRAMEWORK MATRIX

INTERVENTION LOGIC	Objectively verifiable indicators	Verification sources	Hypothesis /Risks
GLOBAL OBJECTIVE :			
Make Cameroon by the year 2035 an international reference in the prevention and fight against emerging and reemerging zoonoses			
Specific objectives :			
Promote the « one health » strategy as a national instrument on the subject matter	Level of vulgarization of the “one health” approach across the nation	<ul style="list-style-type: none"> • Strategy documents • Project and Program documents 	
Strengthen collaboration between national services of animal (domestic and wild), human and environmental health in order to ameliorate surveillance, investigation and prevention of zoonoses	<ul style="list-style-type: none"> • frequency of meetings between staff of each of the concerned areas • frequency and rhythm of circulation of information between staff • rate of reduction of zoonoses at the national level 	Surveys and studies reports	<ul style="list-style-type: none"> • available legislation • adhesion of the population
Bring under control, the major risks of infection and contamination of the human population by emerging and reemerging zoonoses	<ul style="list-style-type: none"> • number of risks put under control • quality of intervention • quality of training dispensed 	<ul style="list-style-type: none"> • reports of evaluation of risks put under control • reports of evaluation of population trained 	Adhesion of the population
Improve and strengthen the quality of services offered in the fight against zoonoses through training and retraining of staff at all levels	<ul style="list-style-type: none"> • relevance of the procedure of delivrance of medical certificates 	Survey and study reports	Strictness in the establishment of medical certificates

	<ul style="list-style-type: none"> credibility of medical certificates 		
Promote scientific research on zoonoses	<ul style="list-style-type: none"> number of validated research projects number of ethical and administrative research authorizations delivered 	Reports and publications	
COMPONENT 1 : Reinforcement of Epidemiological Surveillance on the Investigation and Prevention of Emerging and Reemerging Zoonoses			
Results :			
Multi-sectoral strategy is applied in the epidemiological surveillance and prevention framework	At least 50% of programmed meetings are multi-sectoral and/or multi staffed.	<ul style="list-style-type: none"> minutes of meetings attendance lists 	- sustainable will of Ministerials in mobilizing their senior staff
	At least 50% of territory covered by multi-sectoral, functional surveillance committees	Map of local committees	
Early and rapid detection of cases assured	Number of institutions possessing personal protection equipment (PPE) and sample collecting materials	<ul style="list-style-type: none"> equipment reception slip alert-signalling form 	<ul style="list-style-type: none"> sustainable will of Ministerials in mobilizing their senior staff simplified administrative and financial procedures
Collection and management of data are guaranteed at all levels	<ul style="list-style-type: none"> number of samples collected methodology of data 	<ul style="list-style-type: none"> reports of epidemiological surveillance agents reports of lab analysis 	

	analysis		
communities are involved in surveillance and prevention activities	Number of health defense organizations created in communities	Minutes / reports on meetings or activities of health defence organizations	- communities sensitized
☞ diagnostic capacities are strengthened	Quality of samples received	Reports of laboratory analysis	Thoroughness of laboratory personnel
	Number of reference labs and those of health establishments and veterinary centres equipped with necessary reagents and logistics	Equipment reception slips	
☞ exposition and transmission risks of zoonoses to humans are reduced	Surveys analyzing the risks of transmission	Survey report	
☞ prevention capacities against epidemics / epizootics markedly reinforced	Diversity of cases taken care of	Investigation and prevention reports	- sustainable will of Ministerials in mobilizing their senior staff - simplified administrative and financial procedures
	Quality of case management protocol	Investigation and prevention reports	
Activities :			
A1.1 apply multi-sectoral strategy in the epidemiological surveillance and prevention framework	Missions, training	Reports	Administrative and financial procedures simplified
A1.2 ensure early detection of cases	Missions, training, equipments	Reports and minutes on reception	
A.1.3 ensure the collection and management of data at all levels	Training, equipments	Reports and minutes on reception	
A.1.4 reinforce diagnostic capacities	Formations, Equipements,	Reports and minutes on reception	

A.1.5 involve communities in surveillance and prevention activities	<ul style="list-style-type: none"> - Sensitization meetings - Legalization procedure for GDS 	Reports and minutes on reception	
A.1.6 reduce the risk of exposure and transmission of zoonoses to human; and from human to human	<ul style="list-style-type: none"> - elaboration of handouts - radio and Tv production 	Reports and minutes on reception Contract with media houses	
A.1.7 management of cases	Missions, medical logistics, drugs, vaccines	Reports and minutes on reception Of materials and equipments	
A.1.8 strengthen capabilities of preventing zoonoses in epidemic or epizootic proportions	Mobile team personnel, movable equipments and materials, missions, training and simulation workshops	Reports and minutes on reception Of materials and equipments	
COMPONENT 2 : REINFORCING BASIC AND OPERATION RESEARCH ON ZOOSE			
☞ An efficient national structure put in place	Preparatory meetings to formulate necessary legislative texts	Official Acts of creation (arreté, decisions etc)	Support of decision makers
☞ Zoonoses prioritized	Survey protocols on the investigation of prioritized zoonoses	Report on survey	Administrative and financial procedures simplified
<ul style="list-style-type: none"> ☞ - qualified staff available ☞ Centres equipped 	<ul style="list-style-type: none"> - Number of trained researchers - Number of equipped centres 	<ul style="list-style-type: none"> -Report of participation of staff in training - equipment supply voucher 	
☞ Detection of new pathogens	Number of new pathogens detected	Reports on lab results	Presence of these pathogens in collected samples
<ul style="list-style-type: none"> ☞ Risky behavioural factors identified ☞ Health risks analysed 	Survey protocols	<ul style="list-style-type: none"> - Reports on surveys - Publications 	Administrative and financial procedures simplified
Production of animal vaccines	Quantity of animal vaccines produced	Vaccine production report	

☞ New techniques developed (sample collection, information system analysis platform)	- Efficacy of developed techniques	Frequency of publication of epidemiological bulletins	
Scientific and economic evaluation and modelling	- Number of scientific papers on zoonoses - Quality of scientific papers on zoonoses	Evaluation report	
- Research results valorized and vulgarized	Publication of research results at all levels	- Reports - Information bulletins	
Activities :			
A2.1 Coordinate and structure research on zoonoses	Exchange forum, website, training	Reports and publications	Administrative and financial procedures simplified
A2.2 Elaborate research framework on prioritized zoonoses	Missions, exchange forum, websites, training	Reports and publications	
A.2.3 Strengthen human and infrastructural resources	Training and equipment	Reports and minutes on reception	
A.2.4 Identification of new pathogens	Training, equipments, diagnostic materials	Reports and minutes on reception	
A.2.5 identify risk factors favoring spread of zoonoses and the determinants for behavioural change	Survey missions on risks analysis	Reports and publications	
A.2.6 develop strategies for vaccine research	Training and equipments	Reports and minutes on reception	
A.2.7 develop new technologies	Equipments, missions, experimentation	Reports, publications and minutes on reception	
A.2.8 develop gadgets to help in public health decision making	-Computer materials and appropriate programs - training in the use of these materials and programs	Reports and minutes on reception	
A.2.9 set up value-added	-Develop fields of	Reports, equipments and	

framework for research results	application - training	materials ; training of GDS	
COMPONENT 3 : REINFORCEMENT OF TRAINING IN THE PREVENTION AND FIGHT AGAINST EMERGING AND REEMERGING ZOOSES			
☞ The « one health » vision is integrated into programs and training curricula as well as in research programs	Number of training options integrating the « one health » approach	Training programs of some human / animal medicine institutions and wildlife management schools	Adhesion of policy makers to educational reforms
☞ Staff involved in epidemiological surveillance systems are trained in surveillance and prevention of zoonoses	Number of training (workshops, seminars) organized	Reports of training workshops	Administrative and financial procedures simplified
☞ Increase in the number of research projects and researchers on zoonoses	Number of Masters and PhD degrees on zoonoses and the « one health » approach	Thèse de masters et de PhD	
☞ Populations at risk are sensitized on zoonotic risks as well as on methods to avoid them and a mass communication plan is applied	Number of mass campaign and meetings	-Minutes of meetings with populations Communication logistics	
Activities :			
(1) Integrate the « one health » approach in pre-university, university and post-graduate syllabuses	Concertation workshops, feasibility studies missions, training of trainers in the domains	Reportst and minutes of meeting	Adhesion of policy makers to educational reforms

(2) Set up a university network for research on the « one health » approach	Website, installation of a coordination of university networks ; training of researchers on the network	Reports, reception reports, coordination set up report, training of researchers of the network in ICT	Administrative and financial procedures simplified
(3) Train workers of animal (domestic and wild) human and environmental health on integrated surveillance and prevention of zoonoses	Training equipemt	Reports and minutes on reception of training equipment	
(4) Sensitize populations on the « one health » approach and promote behavioural changes in communities	Convention with media, prospectus and stickers, banners, radio and TV broadcasts	Reports, collaboration convention and CD	

MINI GLOSSARY

WILD ANIMALS: animal living free in nature (in wild); animal in captivity or domestic animal gone wild.

The “one health” concept: A strategy which takes into account health issues which border on the intersection between human health, animal health (domestic and wild animals) and the ecosystem. This is an inter- disciplinary, holistic and integral approach to health problems.

The “one health” only strategy implies the integration and the intra and inter-sectoral coordination for the surveillance of disease, the investigation of epidemics and prevention activities carried out in a joint manner by professionals of different disciplines. This strategy reinforces all the sectors and increases the links between them to ease the efficient use of limited resources, to rapidly and efficiently ameliorate the know-how of different sectors for a better prevention and control of disease

Intersectoral : exchanges inside the different system of animal, human and environmental health

Intra-sectoral –exchange between all the different sectors at the interfaces of animal, human and environmental health etc

Integration: harmonizing of the different methods, programs or formulae for data collection, norms and definition of cases in a way as to have coherent information and to optimize the efforts of the different prevention and disease fighting programs and different workers

Sanitary slaughtering: operation carried out under the veterinary administration’s authority following the confirmation of a disease and it consist of sacrificing (appropriate killing and disposal) of all sick and contaminated animals; if necessary, all animals in other herds exposed to the contagion either directly or indirectly are also sacrificed.

Animal: mammals, birds and bees

A case: a human being or animal affected by an infectious or parasitic disease

Incidence: number of new cases of a disease occurring in a known population over a specific period of time

Laboratory: an institution, which is well equipped and employs technically competent persons under the supervision of a specialist in diagnostic methods, who validates the results obtained.

Notification: procedure by which the health or veterinary administration informs the bureau or the central bureau informs the health or veterinary administration on the suspicion or confirmation of a site of a disease according to RSI rules or the international zoo- sanitary code

Frontier post: airport, railway station or ordinary road opened to international exchange of goods or circulation of people where there can be human control post or veterinary inspection during importation

Prevalence: prevalence is a proportion representing the probability of an individual (animal or human) having a specific disease at a given time. It is worth noting that prevalence does not differential between old and new cases.

Quarantine station: installation placed under the control of the human or animal health administration and in which a group of human beings or animal are kept for observation for a determined period of time and if possible undergo diagnostic tests and treatment

Police sanitaire: all legal hygienic, medical and sanitary measures instituted to prevent the apparition and spread of legally contagious diseases.

Surveillance: this involves the systematic and continuous gathering as well as diffusion of the said data to those in need of it. Surveillance is necessary to plan, set up and evaluate health or sanitary practices.

Coordination: working or acting together effectively in order to rationally and effectively use available resources for different programs concerning diseases

Sanitary watch-dog: surveillance actions instituted to monitor the health of populations (animal or humans) so as to prevent epidemic or epizootic disease threats.

Zoonosis: infection or infestation naturally transmitted to man and vice visa. It is caused by different biological agents such as viruses, bacteria, fungi, etc. zoonosis is as a result of complex interaction of a reservoir, a host and the infectious agents in milieu, each evolving under the pressure of the three others

Emerging zoonosis: a zoonosis that is newly recognized or newly evolved or that has occurred previously but shows an increase in incidence or expansion in geography, host or vector range (WHO, FAO, OIE, 2004).

We talk of Re-emerging zoonosis when a known disease appear in a new geographical area, broadens her host or registers a high prevalence rate.

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