

**Proceedings of the 80th Anniversary Celebrations of the National Veterinary Research
Institute, Vom
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FOREWORD



What began in 1924 as a small laboratory for the production of an antiserum for the control of the deadly Rinderpest scourge has today grown into a renowned Institute, the National Veterinary Research Institute, Vom, with a wide mandate for livestock research and development, vaccine production and training of middle level manpower.

The Celebration of the 80 years of existence of the Institute organized along with the 41st Annual Congress of the Nigerian Veterinary Medical Association brought together all Nigerian veterinarians and other experts to focus attention on Livestock Research and Development in Nigeria and the challenges imposed by increased globalisation.

Activities slated for the celebrations included a Plenary Session which focussed on “Eighty years of veterinary research and livestock production in Nigeria” and a Symposium on “Emerging livestock diseases and the threats they pose to livestock production and development in Nigeria”. The large turnout of researchers, policy makers, practitioners and other experts in the field afforded an opportunity for interaction and the exchange of ideas on finding ways and means of proffering solutions to livestock disease and production problems confronting the nation.

The Plenary Session focused attention on the achievements of the past century and to redirect the efforts of livestock Research and Development in the 21st century. The Symposium on the other hand drew attention to emerging diseases in an increasingly globalised world where disease respects no boundaries. Re-emerging diseases such as African Swine Fever (ASF), Avian Influenza, Bovine Spongiform Encephalopathy (BSE), Nipah Virus, Rift Valley Fever (RVF) and the threats they posed to livestock development were highlighted.

The occasion of the 80th Anniversary celebrations was also used to recognise the pioneering efforts of retired staff and achievements of deserving staff of the Institute and the contributions of non-Governmental Organisations involved with livestock development in Nigeria.

This Book of Proceedings is a full documentation of the Plenary Session and Symposium of the 80th Anniversary celebrations of the NVRI, Vom. This Proceedings highlighted the issues confronting emergency preparedness for emerging and transboundary livestock diseases. It is hoped that the papers and recommendations will contribute to the formulation of policy options for livestock development in Nigeria as some of the Policy Makers were present at the various deliberations.

Dr. (Mrs) L. H. Lombin

Director and Chief Executive,
National Veterinary Research Institute, Vom

ADDRESS BY DIRECTOR, NATIONAL VETERINARY RESEARCH INSTITUTE, DR (MRS). LAMI H. LOMBIN DVM, MS.c, PhD, FCVSN

PROTOCOL

It is to the glory of the Almighty God that I stand before you today, our distinguished guests, staff of the National Veterinary Research Institute, both serving and retired, fellow veterinarians, friends of the Institute and the veterinary profession and particularly our esteemed livestock farmers whom we all serve - to welcome you to this very memorable occasion. Since you have already been welcomed into Plateau State, it is my greatest delight and pleasure to welcome you very warmly to Kaduna-Vom: the cradle of the veterinary profession in Nigeria, to join us to celebrate the joint events of the 80th anniversary of the establishment of the National Veterinary Research Institute and the 41st Annual Congress of the Nigerian Veterinary Medical Association.

Among several reasons why this celebration is unique, one, which may be mentioned in a lighter mood, is that mother and child are celebrating different events at the same time and place. The mother, being the National Veterinary Research Institute, while the child is the Nigerian Veterinary Medical Association.

We are celebrating 80 years of this research Institute because, by the special grace of God, through the unrelenting efforts of our predecessors and our own modest striving, several milestones stand out as we look back at the history of the Institute. From the singular mandate of the Institute in 1924 of producing rinderpest anti-serum to control the ravaging disease, the Institute now produces seventeen different types of vaccines. The mandate of the Institute now having been expanded to conduct research into:

- All aspects of animal diseases and their control,
- The development and production of vaccines and sera, and
- Introduction of exotic breeds of animals to improve meat, milk and egg production
- All aspects of animal nutrition, standardization, and quality control of animal feeds.
- Training of intermediate level manpower for both laboratory and clinical veterinary services.



Apart from the increase in both the types of vaccines and sera produced, the Institute has produced several ethno-veterinary biologicals and products for the control of skin diseases in both animals and man. The progress and successes recorded in this area has culminated in the recognition of the Institute's Dermatophilosis Centre and Parasitology Department as referral centres for different skin diseases. With clinical and toxicity trials over, these developed medications are awaiting NAFDAC certification to enable commercial production.

In the same vein, it is worth mentioning and celebrating the fact that the Institute has been accorded international recognition in the year 2002 as a Collaborating Centre, by the Food and Agriculture Organisation, for Emergency Preparedness (EMPRES) for Trans-boundary Animal Diseases for West and Central Africa. Over the years, the wisdom and foresight of our predecessors led to the establishment of various facilities from which most of our raw materials are sourced internally. These facilities include the various farms and the multipurpose feed mill. It is my opinion that a large proportion of the factors responsible for the continued existence of the Institute stems from this internal sourcing of research and vaccine production

raw materials. However, because of age most of these facilities now cry for attention and the urgent need to replace them stares us in the face.

The story of the introduction of the Japanese quail into the Country by the Institute and its subsequent distribution to and adoption by farmers bears its own testimony. Distinguished ladies and gentlemen, if you have never eaten or tasted quail before, you must endeavour to do so before you leave Vom. You will be our witnesses henceforth.

Being a farmer-oriented service Institution, the development of the rural kerosene incubator for the hatching of eggs is a most notable achievement of the Institute. This is already being used to significantly boost local chicken production particularly.

To ensure that the Institute's research findings reach the farmer and to allow for a forum for farmers to ask questions, the Institute has been producing and broadcasting programmes in the following languages - Hausa, *Mu leka rugage* Yoruba, *Itoju ohun osin* Igbo, *Ahu Ike Umu Anumanu* and Pidgin English over some radio stations.

In the recent past the management of the Institute determined to sharpen its focus came up with a Mission Statement

"to be the foremost veterinary research Institute in Africa, producing International quality vaccines and offering services for the identification, control, and eradication of economically important livestock diseases through best practices research excellence and applying modern technology, with highly trained, experienced and motivated personnel".

What can we achieve? you may ask. With belief in ourselves and the sheer determination of the Institute staff to succeed, the firm financial support from government and active private sector participation in the buying of research technology, yes that mission can be accomplished. On the part of the Institute, we have been guided by this mission statement for all our developmental strategies for the last two years.

We are confident that these are achievable since the Institute is blessed with a cream of researchers that are among the best in the country. Their training and re-training has been embarked upon intensively. Through collaboration with specialist research scientists in the Universities, the Institute mounted a series of training programmes aimed at improving technical knowledge and confidence in staff to enable them perform effectively and efficiently all their assigned duties using current techniques. The confidence gained during these courses impacted positively on the research skills and performance and within just two years the quality and quantity of publication of research materials increased greatly which has led to the floating of the first ever journal from the Institute in its 80 years of existence. This indeed is no mean feat and we pledge to continue with this publication.

In an effort to conform to Good Manufacturing Practice GMP, the Institute is currently restructuring its vaccine producing laboratories. The replacement of our laboratory and vaccine production equipment and machinery are being pursued with vigour. I must mention here that through the able leadership and Government of our farmer-President, Chief Olusegun Obasanjo, the Institute has received support and funding for new laboratory equipment. We thank you for believing in us and for procuring the vaccines for your farm from the Institute. Your personal and enduring interest led us today in having a Labelling Machine, which arrived just two days ago, and a most modern Freeze-Dryer, which is expected on ground any moment from now through the release of ₦290million because of your personal intervention. Also other essential equipment including Biological safety cabinets types I, II & III, REVCO Deep-freezers and fume hoods are expected soon. What this means in essence is that most of the obsolete equipment are soon to be a thing of the past. It is hoped that funding will be sustained

to see to the completion of the replacement process. I however wish to plead that while appreciating the enormous demand on Government for funding by all Sectors, research must not be relegated to the background in funding.

Please permit me to briefly list a number of activities the Institute has embarked upon in the last three (3) years.

They include the establishment of

1. An animal experimental station to be used for clinical trials and vaccine trials before release for field trials.
2. Minimal disease poultry farms to ensure that eggs used for vaccine production are free from extraneous contaminants.
3. A minimum containment facility for Foot and Mouth (FMD) Disease including a vaccine production facility for FMD and African Swine Fever.
4. The sinking of a dedicated borehole for the vaccine production facility in the Virology Department to maintain the quality of our vaccines.
5. Deployment of a (VSAT) Internet facility to bolster the quality of research, extension and diagnostic services through the provision of immediate access to information.

At this juncture, I will like to call on the Private Sector to believe and support agricultural research today as this is a guarantee for the continuation of your business tomorrow. Output from research will lead to new and innovative methods, technologies or products, which the Private Sector will require to adapt in its existing facilities or to sell to the public as service or products.

Distinguished Ladies and Gentlemen, what this means is we all need one another to succeed. As we go around the Institute and as we celebrate 80 years of existence let us look beyond the glitter. There is a lot of rot that has to be addressed for any genuine progress in livestock research to be made. We believe in our ability as an Institute by the Grace of God to be able to work through but we need your support.

This celebration of achievements cannot be complete without mention of our two Colleges, the Federal College of Animal Health & Production Technology and the Federal College of Veterinary & Medical Laboratory Technology and the NVRI Staff School. These training Institutions have equally grown and matured like their parent Institute, having produced numerous prominent graduates. It is pleasing to note that the high academic standards are still being maintained. The NVRI Staff School last year won laurels at the National and International State Junior Engineers, Technicians and Scientists (JETS) competition to the delight and satisfaction of all.

At this juncture, I wish to pay tribute to whom tribute is due, recognition to whom recognition is due and honour to whom honour is due. Through the committed efforts of these eminent researchers, distinguished scholars, astute administrators and above all their keen interest in the veterinary profession, whether as Veterinarians, Scientists or just workers, the National Veterinary Research Institute has been able to make these remarkable achievements. Because their hearts are still with us here in Vom, they have left everything else to celebrate with us today. I have the pleasure therefore of recognizing the presence of His Royal Highness, Oba (Dr) K.A.O. Sansi, The Obelu of Esure, who was Director of Veterinary Research between 1975 and 1979. Kabiyesi, you are most highly welcome home.

I have the pleasure to recognize the presence of the successor to Kabiyesi, and the longest serving Director of the Institute, Dr. Abubakar G. Lamorde, who was Director between, 1979 and 2001. You are highly welcome home. We will continue to remember you, we pray for God's blessings upon you and may he continue to guide you aright in your present endeavours. Mention must also be made of pa (Dr) R.A.O. Shonekan, His Majesty the King Prof. J.T.J. Princewill, Amanyanabo of Kalabari Kingdom, His

Royal Highness, Prof. Zayyanu Abdullahi, the Emir of Yauri, we appreciate your presence here today. Also, we welcome our friends from South Africa, Canada, United Kingdom and The Netherlands.

Although it would have been nice to call each and every retired staff of the Institute by name, this we cannot do now. However, as we see your radiant faces and warm smiles we know you still feel part of and belong to this great Institute. But for your labour in the vineyard of the NVRI, we will not be celebrating today.

Distinguished Chairman, Special Guest of Honour, Ladies and Gentlemen, I thank you all once again for gracing this occasion with us and I pray for long life so that in 20 years time we will all assemble here again to assess our performances and to reaffirm our commitment to the progress of this Institute during the centenary celebration. I wish you all journey mercies as you go back to your various destinations. May God Bless you all, May God bless the National Veterinary Research Institute, Vom and May God Bless Nigeria.

WELCOME ADDRESS BY THE HONOURABLE MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT, MALLAM ADAMU BELLO, (FCIB) (*Dan Iyan Adamawa*)

PROTOCOL

It is a great privilege and honour for me to welcome you, Your Excellency Mr. President, to Vom, to witness the celebration of the 80th Anniversary of the National Veterinary Research Institute, (NVRI) Vom and the hosting of the 41st Annual Congress of the Nigerian Veterinary Medical Association (NVMA). I would also like to seize this opportunity to welcome all our invited dignitaries and guests to this important occasion. The support that my Ministry is receiving in all aspects from your Excellency and all other organizations and individuals and as exemplified by honouring this invitation is highly commendable.

What is now known as the National Veterinary Research Institute started as a Veterinary Department in Zaria in 1916 and was later moved as a Laboratory to Vom in 1924 by the then colonial administration in response to the devastating livestock disease rinderpest. Today, the Institute is charged with the mandate of conducting research into animal diseases and to manufacture vaccines and sera required for the control of livestock and poultry diseases in the country.

The Institute has come of age and today we are celebrating 80 years of its existence. I am delighted to add here your Excellency, that during these eighty glorious years, the Institute has recorded profound and remarkable milestones in her mandate. As at today, the Institute has developed and produced 10 different types of viral vaccines for poultry, dogs, sheep and goats and seven bacterial vaccines for cattle and poultry. Similarly, the Institute operates a Dermatophilosis Centre where in-depth research on the organism and its effects on cattle are carried out. The Institute also currently has six different types of vaccines at advanced stages of Research and Development.

The theme of the 41st Annual Congress of the NVMA - 80 years of Veterinary Research and Vaccine Production will therefore no doubt provide a timely platform to discuss the past and look into future prospects.

Your Excellency, the NVRI has also extended her services into the diagnosis of livestock and poultry diseases, where it operates a Central Reference Laboratory here in Vom and 20 outstation laboratories located in all the geopolitical zones of the Country. These laboratories, provide diagnostic services to clients, and are involved in epidemiological investigations and documentation of various livestock and poultry diseases. In its effort to provide appropriate technologies for farmers and other end users, the Institute has fabricated the kerosene incubator and simple agricultural implements. Furthermore, in response to the need for middle-level manpower in agriculture, the Institute has two colleges, the Federal College of Animal Health and Production Technology and the Federal College of Veterinary and Medical Laboratory Technology that train Veterinary and Medical Laboratory and Animal Health and Production Technologists.

Your Excellency, the National Veterinary Research Institute, Vom, and the Nigerian Veterinary Medical Association are two bodies, which are complimentary to each other. My Ministry therefore considers them of immense importance to the Livestock sub-sector and is always associated with their activities. It is note worthy to state here that the National Veterinary Research Institute, Vom has on its staff roll over 45% of Veterinarians employed by my Ministry and is associated with over 80% of practicing Veterinarians as clients. It is therefore not surprising that the Institute has agreed to host jointly with the

NVMA, the 80th Anniversary Celebration and the 41st Annual Congress of the Nigerian Veterinary Medical Association.

Your Excellency, You are aware that the livestock sub-sector still contributes about 20% of the national income derived from agricultural production and provides about 78% of the total meat in the Country. The contribution of the livestock sub-sector to the economy is therefore not in doubt and government has continued to give all the support necessary to all Institutions associated with livestock production and health. It is in this regard that Government has continued to improve on the facilities for vaccine production and fund research into livestock and poultry diseases. I am happy to state here that the Institute has made its mark in the provision of vaccines of high quality for the control of major livestock and poultry diseases and has recorded increases in the total number of vaccines produced as well as research activities.

Your Excellency, distinguished guests, the major challenges ahead of the Nigerian Livestock Industry and the Veterinary profession in general is in the improvement of the efficiency of animal disease control and production in our national herd and flock. Such challenges require the application of appropriate technologies in Veterinary Sciences. This, I assure your Excellency that my Ministry is addressing very well, through the activities of the NVRI, Veterinary Institutions and Colleges and the continuous capacity building and motivation of the Veterinary professionals in our employment.

May I therefore seize this opportunity to encourage the NVRI and members of the NVMA to be more dedicated to their work and come up with new ideas in addressing animal diseases and production to make the Veterinary profession relevant in this era of competitiveness and globalization.

Your Excellency, distinguished ladies and gentlemen, I wish to inform you that the College of Veterinary Surgeons, Nigeria (CVSN), which is primarily responsible for providing professional postgraduate training for members of the Veterinary Profession, is also using this occasion to launch an Endowment Fund. The fund is to put in place infrastructure to kick off the academic programmes of the College. I therefore welcome your generous donations towards this fund launch.

Before I conclude this welcome address, May I congratulate the Director of the Institute and her Staff, and officials of the NVMA for organizing this grand celebration. I implore you all to go round the Institute and familiarize yourselves with what we are celebrating because of the past 80 years of its existence.

Your Excellency, Distinguished invited guests, ladies and gentlemen, I once again warmly welcome you all to this anniversary celebration and wish you fruitful deliberations at your annual congress.

Thank you and God bless.



Opening Ceremony: (L – R) The Executive Governor Plateau State, Chief Joshua C. Dariye, The Honorable Minister of Agriculture, Mal. Adamu Bello (Dan Iyan Adamawa), The Chairman of the Occasion, Chief Audu Ogbe OFR (National Chairman PDP) and Chief Olatunde A. Badmus (National President Poultry Association of Nigeria)

DR. JUNAIDU MAINA,

POST GRADUATE COLLEGE OF VETERINARY SURGEONS: ENDOWMENT FUND BRIEF BY PRESIDENT, VETERINARY COUNCIL OF NIGERIA

PROTOCOL

The development of livestock services in Nigeria has a long history going back to the pre-colonial days. However, it was in 1901 that the first Veterinary Surgeon was posted by the British Colonial office to work in the country to treat horses and donkeys that were used for transport and the haulage of goods. With the outbreak of Rinderpest in 1913, a vaccination centre was set up near Zaria for the inoculation of cattle against the disease. The centre grew and began to provide other veterinary services to the local livestock population following the recruitment and training of local personnel as inoculators and attendants.

By 1924, the Colonial Government established a Veterinary Research centre here in Vom to conduct research into animal diseases and to produce vaccines and sera required for the delivery of field veterinary services. As the scope of the centre's mandate was enlarged to include the other British West African countries of Gambia, Ghana and Western Cameroon, a School for the training of Veterinary Auxiliaries was added in order to provide indigenous personnel to supplement the colonial work force.

In 1952, an Ordinance creating the Veterinary Council of Nigeria was passed by Government for the registration of Veterinary Surgeons. Apart from establishing the competence of persons applying for registration, the Council also had the mandate to act as a Disciplinary Board on professional matters and practice. Today, the Council among other activities facilitates the accreditation of Veterinary courses and training in Nigerian universities.

At its 69th meeting held on the 13th & 14th of April 1992 at the Sheraton Hotel and Towers Abuja, Council approved the establishment of the Postgraduate College of Veterinary Surgeons, Nigeria (CVSN). This is in accordance with provisions of the Veterinary Surgeons Act empowering it to do anything, which in Councils opinion would promote a high standard of professionalism in the country.

The primary purpose of the College is to provide professional postgraduate training for members of the profession, to continually improve their professional knowledge and competence. The curriculum will emphasise advanced knowledge as well as clinical and practical capabilities in livestock and poultry health, production management, companion animal health, veterinary surgery, aquaculture management and health as well as the vital interface of public health and disease prevention. The College also has the responsibility of rewarding excellence in the profession.

On Tuesday October 27th 1998, Foundations Fellows of the College were honoured at the first investiture ceremony held at the International Conference Centre, Abuja. Since then these Foundation Fellows, under the supervision of the Veterinary Council of Nigeria have made great strides in setting the machinery for the take-off of the College. The Following have so far been achieved:

- The publication of a College handbook which gives details of the initial take-off of the four speciality groups of the College, the administrative set up and the procedure for the acquisition of College Diplomas



DR. JUNAIDU MAINA,

- The acquisition of a temporary College office in the former Council Secretariat in Vom
- The appointment of a College Secretary
- The preparation of College curricula and syllabuses for the various speciality groups
- The identification of Centres of Excellence in the Faculties of Veterinary Medicine of Universities for the take-off of College programmes and
- The identification of resource personnel for the College

Your Excellencies, Ladies and gentlemen, the task before the College of Veterinary Surgeons of Nigeria is not an easy one especially when viewed against the background of lack of adequate funds to implement some of its laudable programmes such as the retraining of veterinarians.

The College has therefore decided to use this unique celebration by the veterinary profession to launch an Endowment Fund in support of planned development of its infra structure and the take-off of its academic and other development programmes.

Funds generated from this launching activity will be targeted at providing key infra structure for the early take-off of the College programmes that would include:

- The development of the College Coordinating Centre with a modern Surgery, Clinical Laboratory, library, Cyber café etc
- The provision of infrastructure and equipment in the centres of excellence
- The promotion of applied research by students of the College in conjunction with the National Veterinary Research Institute, Vom and other institutions
- The recruitment of resource persons, staff development and capacity-building

As we gather to celebrate the 80th anniversary of the National Veterinary Research institute, Vom and the 41st Annual Congress of the Nigerian Veterinary Medical Association, may I on behalf of the Veterinary Council of Nigeria and the College request your financial support to the Endowment Fund.

Our target is to raise 500 million Naira and I believe that we can count on all of you to join in laying a good foundation for the development of veterinary training and practice in Nigeria.

ADDRESS BY THE CHAIRMAN OF THE OCCASION, CHIEF AUDU OGBE (OFR) SPECIAL ADVISER TO THE PRESIDENT ON AGRICULTURE AND NATIONAL CHAIRMAN PEOPLES DEMOCRATIC PARTY (PDP)

PROTOCOL

I was coming out of Abuja to do just one assignment and now I've been loaded with a lot of responsibilities one of which I shall discharge shortly; acting President for 10 min; which is a very heavy burden but I hope to carry it and retire quickly.

I want to do two things right now; as Chairman of the occasion, it was I who authorized all of you to speak before me and I just want to make a few comments before I also read the speech of the President. I want to thank the Almighty God and those who founded this Institute 80 years ago. I also want to thank all the researchers who have been here, the staff members in particular and the Director of the Institute, Mrs. Lami Lombin.

At Independence, was the thing and Nigeria was much happier than it is today. Oil came and with it, many other headaches. Not that we regret the discovery of oil, but that it turned us into, or made us victims of what they call the Dutch disease. We fell asleep and stopped thinking all together; and we embarked on a diet of importation of everything, toothpicks, handkerchiefs, pencils, rice, sugar, milk. We were told by a very brilliant analyst that it was cheaper to import and that all that we needed to do was find some money, go to a bank, open a letter of credit, bring in a ship load of whatever and we became rich overnight.

A man who brings in one ship load of rice of 15,000 tons probably makes something in the neighbourhood or N15million in profit but by bringing in 15,000 tons, he has probably displaced about five to 10 thousand farmers across the country. We subsequently imported unemployment along with the grains of rice and then we boast of having a huge population of about 130 million people. A huge population is an asset if it is productive. A huge population is a dangerous liability if it is idle; and then we are also persuaded to forget livestock production and we began importing chicken and turkey parts and beef and fish and even powdered milk, eggs. We also said that it was a brilliant concept; it is cheaper to import. Just a year ago we sat down and said wait a minute "how can we continue importing everything, what do we do with this large population: so we said no more! No more chicken imports, turkey parts, no more beef and very soon no more fish. We were criticized very strongly by the opponents of globalization, adherents of the tenets of the World Trade Organization. We were told that after all that as part of the global village; throw your doors open and we went even further than that, we removed our roofs and our windows and we got drenched.

We earned in the best of years \$14 billion from oil and very little else and with that we want to service the FG, State and Local Governments, we want to maintain 26 Federal Universities; and between states and the private sector, another 30; a total of 56 Universities, 48 Colleges of Education and 36 Polytechnics. As for the Research Institutes in the Agricultural Sector, there are about 17 of you: and many more. We want to run and maintain our roads, build our railway system, build refineries maintain an army and navy and air force, a police force of 315 thousand men going on to 400,000; some of whom earn only N8,000 per month. The budget of the state of Sao Paulo, one of the 28 States in Brazil is \$26 billion per annum. It gives \$4 billion to Agricultural research. In comparison compare that with our national budget between state, federal and local governments of less than \$18 billion per annum. We are not as rich as we pretend to be; so, after many years in the wilderness, we've decided to return to reality. In banning some of these products, we're criticized, attacked by WTO, but our argument is

simple; "we must put a 140 million people to work besides that, Africa has only 2% of world trade; just 2% very little else.

For you the Veterinary Doctors and for this Institute, your assignment is a very huge one. I was talking with the Chairman of Poultry Association just now, Chief Badmus and I asked him what the average consumption of eggs is, per capita in Nigeria. It is still less than 40 eggs per person per annum. In the United States it is well over 300. In their own case, it is a bit too high because most of them nearly 60% are oversized. How many cows do we have in Nigeria if anybody can guess, it may not be more than 15 million head. We were in Brazil with the Chairman of the House of Representatives Committee on Agriculture and Chief Badmus about a year ago and we were told that they have well over 100 million cows for a country of a 160 million people. What is the lactation of the average Nigerian cow per season? about 300 litres of milk. What is that of a cow in South Africa? Probably 5-7 thousand litres of milk per annum and in places like Denmark maybe as high as 9-10 thousand. What is the consumption of protein in the diet of our people as a nation? If you go round the villages the only time most people have access to meat, fish or beef is when there is a funeral or a wedding. People simply can't afford it and the children particularly between the ages of one and six suffer severe retardation if their intake of protein is low. You the doctors know that, and even as adults, at a certain age in life we are even to go back on a diet of milk for fear of suffering what you scientists call osteoporosis; the bones begin to wither and we begin to loose height, not just weight.

There is work for you to do; our dear scientists and we must thank you for keeping this Institute alive for 80 years. I just want to say that the party appreciates what you are doing. No political party can afford to ignore the relevance of science and research and you the researchers may not have the entire front page headlines; you are hardly mentioned in your labs, but we are aware that you are there and it is your work that sustains the foundation of democracy and governance.

I want to throw a challenge to those of you who are practitioners of veterinary science. The VC ABU made a comment just now that many of these young men who graduate now-a-days are roaming the streets. That is a little depressing. I know that jobs are few and far between now and you who studied veterinary medicine should make efforts to practice veterinary medicine as individual business men and entrepreneurs and women too. I am aware that one of the problems is the lack of funds; that the interest rates in Nigeria are actually forbidden for Agriculture practice as in deed for everything else. At 30% or 35% interest rate nobody can invest in anything viable except perhaps the production and marketing of cocaine. But that is not what we want and that is one of the tragedies too; it is only around Africa and a few nations in South America where you hear of these interest rates of 30-35%. China just moved off from 5 to 5¼% and in Western Europe interest rates average about 4%. But we are always told that if you bring down the interest rate, there will be inflation and when I asked them not being an economist, I am just a small cashew farmer I asked them; which is worse? total lack of growth in an economy or inflation and nobody seems to answer. How can any economy grow at 35% interest rate? So this administration has put money in the Bank of Agriculture at a discriminatory interest rate of 10% and we urge you the veterinary doctors to please try and practice what you have learnt. I believe that some of you who decide to keep as few as 10 milk cows behind your house will discover that you are richer than the Fulani man with a hundred because of what you know and what you can do. Why don't some of try to breed even dogs for the security agencies? It won't cost you much. An Alsatian dog today at 6 weeks or 6 months will cost you no less than N25, 000.00, why don't some of you try to keep some chicken. Some of you from the Southern States breed snails, fish, why don't you keep goats and pigs and so on and so forth? We need you to show us how to do it; because most of us who are doing these things did not fail and do not have the knowledge you have.

I like to congratulate Mrs. Lombin for her achievements here and congratulate all of you who work with her. Gone are the days when men for no real reason attribute to themselves certain superiority. Women

have continued to prove that they can do it well too. They have a certain capacity for concentration, of dedication beginning in the house, the children, the kitchen, management of money and resources even when they're lean and I must pay tribute to Nigerian women which is why our party has a special policy for promoting their participation in governance.

We thank you for your efforts and I must tell you that I am jealous of you scientists; I failed to be one. In secondary school in my last examination before I fled from science and took refuge in the arts, I scored only 39% in chemistry and the chemistry teacher; a certain American wrote in my report; "This young man has very big ideas, but they are not for chemistry". I brought the report home but thank God my father couldn't read and write so I was in no danger of being rebuked. But later in life I found science an extremely fascinating and attractive subject. I find myself interested in machines, in Agriculture to an extent which I have not quite understood and I look around and see what science has done for humanity and what you scientists in Nigeria have done especially those of you in our research Institutes. You are among the best in the world; even though we have not always been able to find you the funding you require to do your work but I assure you we will try as time goes on.

I want to conclude this by saying that we should not joke with the capacity of our women folk. This reminds me of a story told by a priest once about a prequalification entrance to paradise where men lined up in a long queue and the angel said to them those of you who were real men on earth and dominated your wives, stand in this queue. There was this long queue and those who were dominated by your wives stay in that queue. That was a small number and the angel took a review of this parade and came upon this man who was barely 4ft. tall; very little man, shivering there and the angel said to him "you mean you too dominated your wife on earth"? and the man said "No Sir" and the angel said "what on earth are you doing on this queue?" He said: "my wife told me to stand here". So the women are here and they are going to play their part in our country in a way that we never dreamt. Let me round this up by saying a word to the Governor of Plateau State. A long time ago in 1961, Richard Nixon lost election to John Kennedy and went back to California to brood. He was flat broke and his wife was nagging so to make her comfortable he said to her darling, I tell you I have left politics, never again will I play that role, I will take care of you, take you out, dinners, picnics, etc and the wife was happy, a week later Nixon told his wife he needed to hop to New York to tidy up his law firm and the wife was happy. He checked into a hotel room and at night, his political supporters assembled and they produced a piece of paper; it was the agenda for the meeting and the one item on it was "the resurrection of Richard Nixon". Joshua Dariye, let me say this is the resurrection of Joshua Dariye. May I on behalf of the party formally congratulate you and ask you to settle down, apply yourself to work, take care of business and promote reconciliation. We took our position because we believed it was the right thing to do. We took our position because there is a book called the constitution. We need to follow what the constitution says. Sometime ago I asked Prof. Wole Soyinka what he thought was the difference between the Caucasian and the African. I am not sure biologists have found any major difference apart from skin pigmentation which makes us slightly browner than the others, but I've always thought that Africans are a little too sentimental. When it suits us, we throw away the rules when it doesn't suit us we want the rules to apply. Let us follow the rules and we will not go wrong too often.

In conclusion, I thank you people engaged in Agriculture, I thank you in this Institute and I want to say that unless and until Agriculture succeeds here, not too many things we try will ever work. Unless the villages are settled the cities will never be at peace and the stomach is the chief law maker to the nation. It has to be filled. Having said that, I am glad that when I was told of the launching, I almost panicked then looking to my left, I found two of my Governors and to my right, the Chairman and the President of the Poultry Association of Nigeria. They will give me support so that I don't from here but to set the

ball rolling I will like to announce on behalf of the party a modest contribution of ~~N2~~ **N12** million to this Institute.



Opening Ceremony: (R-L) the Executive Governor of Nassarawa State, Alh. Abdullahi Adamu and Hon. Dr. Lawal, (Chairman House Committee on Agriculture

ADDRESS BY CHIEF OLUSEGUN OBASANJO GCFR, PRESIDENT COMMANDER-IN-CHIEF OF THE ARMED FORCES, FEDERAL REPUBLIC OF NIGERIA

PROTOCOL:

I am happy to be here today on the occasion of the 80th Anniversary celebration of the National Veterinary Research Institute, (NVRI) Vom and the 41st Annual Congress of the Nigerian Veterinary Medical Association, (NVMA) being held here in Vom. Eighty years in the life of any Institution is by any standard worthy of celebration. I congratulate the Institute and the Veterinary Profession on this auspicious occasion. I also wish to felicitate with the NVMA on its 41st Annual Congress and its choice of the theme: "80 years of Veterinary Research and Vaccine Production". I hope this joint occasion will enable the Veterinary profession to have an in-depth reflection on the way forward for Veterinary Research and Vaccine Production in the Country.

There is no doubt that a viable and sustainable agricultural sector is the backbone of our national economic rebirth. In recognition of this fact, my administration has put in place a national agricultural policy, the thrust of which has been clearly indicated in our drive for, food self-sufficiency, agricultural produce export, poverty alleviation and employment generation.

To achieve the policy objectives stated above, we have put in place the National Special Programme on Food Security (SPFS), the Presidential Initiative on various commodities amongst which are the Presidential Initiative on Livestock and the Presidential Committee on National Dairy Development Programme. Indeed, the policy objectives of government in agriculture have been properly situated in our National Development strategy as enunciated in the National Economic Empowerment and Development Strategy (NEEDS) document.

It is certain that all our agricultural development efforts can only be attained through a very strong, effective and virile agricultural research system, which provides the needed improved and appropriate technologies for use by farmers and other end-users. I wish to acknowledge that 80 years of Veterinary Research has no doubt yielded very useful results that have supported the Livestock and Poultry Industry in Nigeria. At Inception in 1924, NVRI was established in response to the devastating effect of Rinderpest outbreaks in cattle and subsequently the Institute became a pioneer in the production of a wide range of animal vaccines in the West African Sub-region. I am therefore proud of the NVRI and the Veterinary Profession that Nigeria today is provisionally declared free of Rinderpest.

Although significant progress has been recorded in Veterinary Research and Vaccine Production there is no doubt that the Livestock Industry in Nigeria is still threatened by some old and emerging diseases. As you celebrate 80 years of Veterinary Research and Vaccine Production, I charge the NVRI and the Veterinary profession to double their efforts in finding solutions to the economic and public health threats posed by diseases such as Foot and Mouth Disease (FMD) and CBPP in cattle, African Swine Fever in pigs and Newcastle and Avian flu of poultry amongst others.

I have no doubt in my mind that the NVRI and the Veterinary Profession have the potential to support the needed growth and development in the Livestock Industry within the West African Sub-region. This provides an opportunity and challenge to the Veterinary Profession especially within the context of the Common African Agricultural Development Programme (CAADP) of the New Partnership for African Development (NEPAD). As a mark of our political will to support the CAADP pillar programmes, my administration shall gradually improve funding to the agricultural sector until we attain the recommended 10% of total national budget.

I recall the release of ₦290million to NVRI in 2003 by Government to procure a freeze-dryer and a labelling machine to enable it improve on the production of vaccines and meet local demand. This was done as a mark of confidence the Government has in the capability of the Institute to continue to contribute positively to the economy.

I wish to assure you that we shall sustain the current level of funding to NVRI, so that it can be rightly positioned for the various challenges of Veterinary Research and Vaccine Production in the Country and the West African Sub-region. However, after 80 years of research and development of livestock and poultry vaccines, it is expected that vaccine production at NVRI has attained a level of maturity for its effective commercialization and private sector participation. I therefore urge the Institute to explore this opportunity while calling on credible private entrepreneurs to consider partnership with the institute.

In conclusion, I wish to draw your attention to the fact that with increasing economic growth and urbanization, many Nigerians now consume livestock products in their diet; this no doubt poses further challenges, which you, as professionals need to address. On our part, we assure you that government will continue to provide the enabling environment for sustainable livestock development in Nigeria.

I wish you all happy 80th Anniversary Celebration of Veterinary Research and Vaccine Production and a successful 41st Annual Veterinary Congress.

Thank you.



Opening Ceremony: (R -L) Deputy Governor of Plateau State, Chief Micheal Botmang, Chief S. D. Lar and Chief Olatunde Badmus



Opening Ceremony: (L-R) Dr. Fasanmi Foluso (Director Federal Livestock Dept . FMARD) and d Dr. Yussuf Haroun, President NVMA

KEY NOTE ADDRESS: VETERINARY RESEARCH AND LIVESTOCK DEVELOPMENT IN NIGERIA: CHALLENGES OF THE 21ST CENTURY

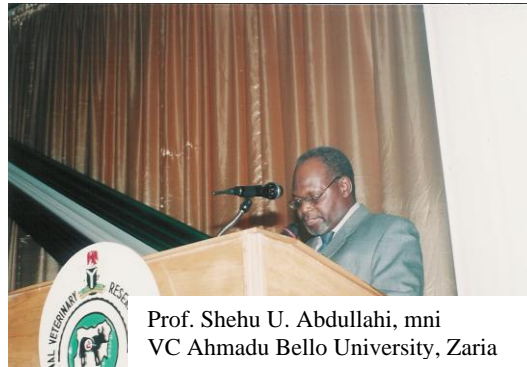
Professor Shehu Usman Abdullahi, mni

Faculty of Veterinary Medicine
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Introduction

I would like to express my sincere gratitude to the organizers of this remarkable gathering of distinguished Veterinarians and livestock experts on the occasion of the 80th Anniversary of the NVRI and the 41st Annual Congress of the NVMA for inviting me to give this keynote address. Staging this two-in-one event is a strong indication of the cooperation between the NVRI and the NVMA. This development is commendable and should be maintained for the success and progress of the Veterinary Profession and Nigeria in general. With the NVRI at 80 and the NVMA holding its 41st Annual Congress, it is indeed time to reflect on the past, present and future of Veterinary research and livestock development in Nigeria. I therefore, consider the subject of this presentation important for a variety of reasons:

- Veterinary Research and Services constitute a major consideration in the success or failure of the livestock industry of any nation
- The vital relevance of the livestock industry in the socio-economic well-being of any nation particularly a developing country such as ours cannot be overemphasized.
- The apparent inability of the Nigerian Livestock Industry to live up to expectation in the provision of adequate and affordable livestock products to the Nigerian populace
- The present unhealthy state of the Nigeria economy, which has been for over two decades, nearly wholly dependent on crude oil exploitation
- The rapidly increasing and seemingly uncontrollable human population in Nigeria that consequently exerts further



Prof. Shehu U. Abdullahi, mni
VC Ahmadu Bello University, Zaria

stress on the Nigerian Livestock Industry.

There is no doubt that government policies during colonial and post-independence periods, which were largely built on the British model, have greatly influenced the emergence of a modern Veterinary Profession in Nigeria. The colonial masters realized that the development of Veterinary services in Nigeria was crucial to the development of an economically viable livestock industry. The history of Veterinary practice in Nigeria can, therefore, be closely linked to the development of the Nigerian livestock industry.

History of Veterinary Practice and Livestock Production in Nigeria

Early attention on livestock concentrated on animal health, breeding as well as selection for different purposes. Veterinary services were primarily geared toward disease control while breeding and selection were done in the various Livestock Improvement and Breeding Centres (LIBCs) as well as some research centres found at different times in different parts of the country. The Livestock sub-sector of Nigeria's agricultural history is intertwined with its political history. This can be approached from three broad epochs, namely; Colonial, the Internal Self Government and the Post-1960 periods:

Livestock production in Nigeria was dominated by nomadic pastoralism long before the advent of British Colonial Administration. The immediate interest of the colonial government in livestock was with the health and hygiene of the domesticated cattle.

The first documented evidence of the initiation of modern Veterinary Service in Nigeria was by the British. The primary aim at that time was to combat the menace posed by rinderpest to cattle in Northern Nigeria. The cattle industry at that period was practically confined to Northern Nigeria where the indigenous Zebu breeds were located. Another major disease of cattle at the period was tsetse-transmitting trypanosomiasis that made Southern Nigeria unsuitable for the cattle industry. Rinderpest infection and mortality rates in cattle were very high and often above 75% and was therefore of great socio-economic importance. The disease brought misery to cattle owners. Thus, the Nigerian Veterinary Department was established in 1914 with its headquarters at Zaria.

In 1924, a small Veterinary laboratory was established in Vom for the production of rinderpest serum. Increased field services raised the demands on the laboratory hence the production of vaccines and other biological products was added to the functions of the laboratory. The recognition of the advantages of Vom as the centre for Veterinary research and for vaccine production, coupled with the major emphasis on the health aspects of livestock production, soon led to the transfer of the headquarters of the Nigerian Veterinary Department from Zaria to Vom.

It was in realization of the need to initiate concrete investigation and improvement of the local stock within the overall concept of the mixed farming policy of the early 1920s that the Colonial Administration established the Shika Stock Farm in 1928. The Farm was mandated to produce male stock that would be distributed to farmers. The objective was

"to turn out, by purely selective breeding, male stock for use as stud by native stock owners." It was proposed that three breeds, namely, the White Fulani, Gudali and Shuwa represented by a dairy herd of about 20 heads each be stocked at Shika.

The Farm's mandate was broadened by 1957 to include production of and investigation on pasture and range management as well as animal health delivery. The additional responsibility given to Shika Stock Farm in the area of pasture production and range management can be considered the centrepiece of the Nigerian Livestock Production Strategy. This is because the success of any livestock production endeavour squarely depends on the availability and quality of feed resources. The functions of the Shika Stock Farm have formed the basis for the new and expanded mandates of the National Animal Production Research Institute (NAPRI) established in 1976. The National Animal Production Research Institute, which has a national mandate in livestock research, has been instrumental in promoting sustainable research for improved animal protein since its inception.

The role of educational advancement in agricultural development in Nigeria was given prominence at an earlier stage. The value of an elementary education in the three Regions to farmers was appreciated and it was suggested that the introduction of a new interest in farming, such as the production of livestock in the Southern Provinces of Nigeria, would attract more educated youths into agriculture. A scheme was started in Katsina Province for teaching sons of farmers the best husbandry methods. Instructions were essentially practical in nature and were centred on mixed farming. Similarly, the study of management of livestock was introduced to the Ibadan Agricultural School where the Education and Agricultural Departments cooperated to

train both teachers responsible for the management of school farms and the agricultural assistants for the Department of Agriculture.

By 1938, three Conferences of West African Agricultural Officers had been held. Besides, the numerous attempts made between 1924 and 1938 to introduce fodder and browse plants into Nigeria (especially at the Veterinary Station, Vom, the Agricultural Station at Samaru and at the Stock Centre at Shika) were reviewed. The need for concerted effort at pasture and grassland management and improvement was adequately documented and a call for more co-operation between the livestock farmers and the traditional agriculturists was made. This was the beginning of organized efforts towards range management for livestock improvement in Nigeria.

In 1940, milk-buying units were established in areas of the Jos Plateau and butter was produced on a commercial scale. The production of cheese and bacon was undertaken shortly after and this became intensified during the Second World War. After the War, livestock produce assumed considerable importance, while in 1948 the operations were taken over by the Department of Commerce and Industry.

A Veterinary School was established at Vom in the early 1940s to train Nigerians for animal health work. A Livestock Investigation Centre (LIC) was also set up as auxiliary to the school and laboratory. Later, an Egg Production Unit was created to supply fertile eggs for virus research, vaccine for both the Veterinary and the Medical Departments and Poultry for research work and vaccine testing. The Nigerian Veterinary Department played a very prominent role in the early history of livestock development in Nigeria. Indeed, by the end of the 1939-45 War, the Department had become internationally recognized and requests were made by the administration of most of the other West African Territories to the

Veterinary Laboratory in Vom for the supply of vaccines.

The serious nature of trypanosomiasis (sleeping sickness) in man and animals was also of great concern to the Colonial Administration in the West African Territories and the need to control this disease led to the establishment in 1947 of a West African Institute for Trypanosomiasis Research (WAITR). A main laboratory to study the disease was sited in Vom, on the Jos Plateau, an ideal location since the tsetse fly vector was absent in that area. Prior to 1951, the Nigerian Veterinary Department had its headquarters, laboratories and a school in Vom, with field offices in each Region. With the coming of regional governments, the Nigerian Veterinary Department was split into separate regional departments.

The Director of Veterinary Services became the Inspector-General of Animal Health Services while the designation of the regional heads remained the same. The post of Inspector-General carried executive authority in the regions only in so far as matters connected with hides and skins trades were concerned. In October 1954, with the introduction of a new Constitution, the Regional Departments became completely autonomous.

The post of the Inspector-General of Animal Health Services was re-designated as the Director of Veterinary Research, responsible to the Federal Government and with executive authority for Veterinary matters in Lagos. In 1967, when 12 States were created in Nigeria, each state assumed responsibility for Veterinary matters, within its boundaries. The initial breeding policy designed to improve livestock in Nigeria concentrated on the locally available breeds of animal. About 1950, there was a modification of this policy, whereby exotic breeds of cattle were introduced to upgrade the local stock.

The Western Nigeria Development Corporation (WNDC) established the Upper Ogun Ranch for the commercial production and distribution of cattle. In the Eastern Region, South Devon cattle were introduced at the Obudu Ranch. Friesian bulls were imported to the farm at Agege in Lagos, while the Teaching and Research Farm at the University of Ibadan obtained foundation stock of cattle from Shika. Extensive facilities were also established for research in piggery and poultry. The administrative machinery for agricultural development and co-ordination was also modified.

Technical committees established for the various aspects of primary production were modified. For instance, the Veterinary Technical Committee was replaced by the enlarged National Livestock Development Committee that reported to the National Council for Agriculture and Natural Resources. The Livestock Meat Authority, established to serve the northern states, had recently been empowered to act on a national scale in collating data and conducting surveys as well as in researching into various aspects of livestock production, slaughter and marketing in Nigeria. In addition to the advancement in Veterinary Services in Nigeria that has been highlighted, the Veterinary Department in Vom metamorphosed into a full-fledged National Veterinary Research Institute that played a very vital role in the Nigerian Livestock Industry particularly in the area of Animal Health Care and Vaccine Production.

The Status of Veterinary Education and Research

A Veterinary degree programme in Nigeria was started for the first time in the first half of the 1960s. Pre-clinical courses were taught at the University of Ibadan while students completed their studies by taking clinical courses at the Ahmadu Bello University, Zaria. From a very humble beginning, Veterinary education has grown to an impressive level. There are currently seven Nigerian universities (Ibadan, Zaria, Nsukka,

Maiduguri, Sokoto, Abeokuta and Makurdi) offering degree programmes in Veterinary Medicine. Many Nigerians have benefited from the Veterinary education available in these Nigerian universities. It is also worth noting that sub-degree programmes related to the Veterinary profession are now offered by many Polytechnics, Colleges of Agriculture and Schools of Animal Health. Thus a large number of graduates of Veterinary-related field are produced.

Similarly, the National Animal Production Research Institute (NAPRI) was established in 1976 at the Ahmadu Bello University, Zaria. The Institute has the mandate to conduct research in all spheres of livestock production in Nigeria for the advancement of the livestock industry. Within the short period of the existence of NAPRI, the Institute has made a lot of progress through research findings in many spheres of animal production. This is addition to the training staff and students from various Nigerian universities and government parastatals on current techniques to maximize livestock productivity in Nigeria. Other achievements include those in the areas of animal breeding, dairy cattle nutrition, dairy calf rearing, animal reproduction/artificial insemination, beef cattle production, small ruminant production, the development of tropically adapted Shika Brown layer grandparent stock, rabbit and swine production, and forage and crop residue production. Many of the research findings have been published in easily readable scientific series that have been passed to livestock farmers through extension workers for on farm application.

The National Veterinary Research Institute is actively involved in research on animal health, particularly on important common diseases. NVRI is also the main organisation involved in research on vaccines.

The Current Status of Veterinary Services

In the spite of numerous obstacles, Veterinary services and the livestock industry continued to develop progressively in Nigeria in the past. Livestock, apart from being utilized as sources of first class proteins in the human diet, have also been utilized for transportation and as draught animals. The exportation of livestock products contributed significantly to the Gross Domestic Product (GDP) until around 1974 (period of the oil boom) when a drastic decline set in (Agwuna, 1983; Nuru, 1984; Abdulkadir, 1985; Nuru, 1990). The period of the oil boom led to the neglect of the agricultural and livestock sub-sector of the economy to the extent that Nigeria became an importer of livestock products. This period also coincided with the gradual decline of Veterinary services.

NVRI, despite several constraints still produces vaccines against the following diseases: CBPP, anthrax, haemorrhagic septicaemia, black quarter, fowl typhoid, fowl cholera, brucellosis, Braxy, blackleg and gangrene, black disease, enterotoxaemia, fowl pox, Gumboro, rabies, Newcastle (ND), pestes des petits ruminants (PPR) and Foot and Mouth Disease (FMD). Under development are tissue culture rabies vaccine for dogs, lumpy skin disease, sheep pox and Marek's disease vaccines. It is also involved in research on the development of anti-snake venom and traditional remedies for the treatment of human and animal skin conditions.

Some admirable achievements in the area of animal health were recorded particularly in the area of prophylaxis (i.e. vaccine production and vaccination) and the treatment of animal diseases in Nigeria in the 1970s and 1980s (Fabiyyi, 1983, Lamorde, 1983). Unfortunately, Veterinary health services are now much less compared to those years. In some parts of Nigeria the services are almost non-existent. This sorry state is mainly due to very low funding for the services resulting in lack of necessary equipment, drugs and vaccines. As if this was

not enough, the markets are full of fake and expired drugs and vaccines.

Another factor militating against effective Veterinary services is that the livestock industry is still heavily dependent on the rural/nomadic/semi-nomadic livestock owners who often prefer cheaper but ineffective drugs and vaccines. Many other problems, such as socio-cultural, inconsistent government policies, finance, endemic animal diseases, lack of facilities for processing and marketing of livestock products, lack of improved pastures and grazing reserves, inadequate sources of cheap animal feeds, over-grazing, outdated animal husbandry/management practices, very high costs of Veterinary services, lack of Government subsidies, high cost of animals and animal products, inaccessibility of rural livestock owners to Veterinary services, and many other limitations still militate against the Nigerian livestock industry.

The development of Veterinary services as provided by veterinarians in Nigeria vis-à-vis its contribution to the development of the livestock industry has been briefly discussed. Veterinarians should recognise other professionals who should be regarded as partners in progress towards an economically viable livestock industry in Nigeria. Some of these professionals include animal scientists, nutritionists, pasture agronomists, economists, rural sociologists, pastoralists, animal husbandry specialists, biometricians, livestock extension specialists and of course the bankers and financiers who can provide loans to the livestock industry.

Challenges of the 21st Century

The bottom line of the success of the livestock industry in any nation is the ability of the industry to produce enough animal products for her domestic use and surplus for export to contribute to the National Economy. However, despite the fact that the Veterinary and other allied

professions have contributed to the development of the livestock industry in Nigeria, the reality of present day Nigeria is that we cannot even produce enough livestock products for our domestic needs. Contrary to expectation, Nigeria has been importing some livestock and livestock products for her domestic needs for many years. Therefore, the livestock industry in Nigeria needs to be urgently revitalized. This is one of the biggest challenges to veterinarians and animal production professionals in the 21st Century.

We should among other things, do the following:

1. Increase animal production in order to meet the increase in human population.
2. Protect the environment from degradation resulting from increase in beef and dairy production through introduction of improved prolific livestock and poultry; improved disease control and prevention and surveillance methods to reduce mortality and drop in production.
3. Improve on the systems of monitoring animal disease incidence with a view to guiding agencies concerned with planning animal disease control programmes.
4. Indicate those areas where veterinary educators should place more emphasis during training and in the establishment of priority areas. Of particular importance are diseases such as CBPP, FMD, trypanosomosis, PPR, ND and Avian Influenza. The production of a CBPP vaccine that will engender a reasonably longer or life-long protection is safe and not capable of inducing cellulitis and ensure wide vaccination coverage is desirable. Resumption and continued production of FMD vaccine in Nigeria containing all the serotypes isolated in Nigeria is another challenge. Although a homologous PPR vaccine is available, its use is not widespread. There is the need to identify why and intensify client education on the disease and its methods of control. Trypanosomosis is a re-emerging disease in Nigeria and there is the need to develop drugs that have long-lasting residual effect and ones that the organism would not develop resistant to easily. There is also the need to develop and popularise a food-based thermostable ND vaccine that is affordable to rural farmers and is easily administered to free-ranging local poultry. Avian influenza (AI) is another emerging disease of economic and public significance that demands more attention of Veterinary service providers. There is the need to determine its status in Nigeria and develop the capability and capacity to produce an effective vaccine to control and prevent it.
5. Ensure that the subsistence farmer benefits directly from Veterinary Research, (i.e., research should be demand-driven).
6. Develop of immunocompetent and disease-resistant livestock and poultry such as strains of poultry resistant to Marek's disease and Salmonellosis.
7. Develop environmentally tolerant breeds of livestock and poultry.
8. Increase the production potentials of indigenous livestock and poultry.
9. Intensify research into Ethnoveterinary Medicine in order to validate its usefulness and scientifically incorporate it into the Veterinary health care delivery system in the country. There is merit in the endeavour because before the advent of orthodox Veterinary Medicine, it had been in use and some benefits had been derived from it for generations (Nuru, 2000).

Research is an expensive venture and requires continuous sustained high level funding to produce a package for development. Universities are involved in basic and applied research while research institutes are generally involved with applied research. Researches are supposed to be coordinated to reduce waste and duplication. There appears to be a gap between research and developmental activities. Perhaps this is because only a few of the research outputs are directly applicable for development. In addition, research and application are often separated from each other. As a result, research recommendations are seldom implemented and results from field applications are not documented. Stakeholders involved in research include scientists (veterinarians in universities and research institutes), funding agencies (governments, NGOs, international agencies), extension agents (for dissemination of information) and the end users of new technologies (farmers, industries and field veterinarians). Government has perhaps realized that it has been left alone to fully fund research and extension services with little contribution by the end-users. Governments also find it cheaper and more convenient to use imported technologies. Therefore, research funding in Nigeria has been dwindling over the years. This is a challenge to the researcher and the end-user in the 21st century.

The veterinarian is involved in generating new technologies through research, disseminating information through publication and extension services, and uses the technologies in the field to provide animal health care delivery. To date, there is no journal of applied Veterinary Research in Nigeria. The existence of this journal will go along way in reducing the rush to conduct research that has no direct relevance to end users. Each applied research should be validated, reproducible and be tailored to solve practical field problems, increase animal production, and improve animal health and welfare.

The first target of the industry should be at least to meet the national demands for livestock products. The costs of livestock and livestock products are still out of the reach of the common Nigerian. Therefore, it is imperative that the government and all professionals in the livestock industry cooperate to evolve an economically viable livestock industry that can be of great socio-economic benefit to Nigeria.

In many industrialized countries of the world, numerous innovations and technologies have been introduced and adopted to boost livestock production. In these countries, notably the Americas, United Kingdom and most Western European countries, the genetic selections of highly productive animals have been intensively carried out for several decades. The result is that in these countries livestock productivity has increased immensely. Some of the technologies employed in the propagation of the genes of highly productive animals include embryo technology and artificial insemination, new vaccines against diseases, new diagnostic techniques to improve efficiency and accuracy, genetic mapping as an aid to livestock breeding programmes, alteration of rumen micro-organism to improve feed utilization, manipulation of rumen eco-system dynamics and other emerging issues of importance. Thus, the application of new scientific knowledge to veterinary research and livestock development will be mostly in two major areas, namely, Biotechnology and Information technology.

Biotechnology

That biotechnology is the global prescription for the prophylaxis and treatment of a myriad of "global diseases" in all spheres of human endeavour needs no elaborate argument. Biotechnology has been rightly considered as one important means of re-stimulating and accelerating the economy, whether on a local, regional,

national or global basis using new biotechnological methods and raw materials. The question that immediately comes to mind is what is the role of this highly multidisciplinary, complex and multifaceted subject in the challenges that lie ahead of Veterinary Research and livestock development in Nigeria?

Globally, biotechnology has been variously defined. Some selected definitions include:

- i. The application of biological organisms, systems or processes to manufacturing and service industries.
- ii. A technology using biological phenomena for copying and manufacturing various kinds of useful substances.
- iii. The application of scientific and engineering principles to the processing of materials by biological agents to produce goods and services.
- iv. The science of the production processes based on the action of micro organisms and their active components and of production process involving the use of cells and tissues from higher organisms.
- v. The use of living organisms and their components in agriculture, food and other industrial processes.
- vi. The integrated use of biochemistry, microbiology and engineering sciences in order to achieve technological/industrial application capabilities of micro organisms and cultured tissue cells or parts thereof.
- vii. The integration of natural sciences and organisms, cells, parts thereof, and

molecular analogues for products and services (Smith, 1996).

From the foregoing, biotechnology is no more than a name given to a set of techniques and processes in the deciphering and use of biological knowledge. While biotechnology has been defined in many forms, this cutting-edge technology implies the use of microbial, animal or plant cells or enzymes to synthesize, breakdown and transform materials for useful purposes.

Biotechnology has its roots in distant history and is developing at a rate similar to that of microelectronics in the mid-1970s. Table 1 shows the historical development of biotechnology. Thus, biotechnology is not a sudden discovery but rather a coming of age of technology that was initiated several decades ago. The main types of companies involved with biotechnology can be placed in seven different categories as shown in Table 2. In the global market today, a programme is only sustainable if it is profitable. Income generation is a feasible feature of biotechnology as shown in Table 3.

Recombinant DNA technology is giving human beings dominance over nature. Biotechnology has made it possible for man to manipulate directly the heritable DNA of cells between different types of organism, creating new exploitable combinations of characters and abilities not previously known to be present on this planet.

Table 1: Development of Biotechnology

	Phase	Origin	Time
1	Biotechnological production of Food & Beverages Beer Production Leavened Bread Wine Fermentation Cultured Milk Products	Samarians & Babylonians Egyptians Near East Louis Pasteur Near East	6000BC 4000BC 1450BC 1857-1876
2	Biotechnological processes initially developed under Non-sterile conditions Ethanol, acetic acid, butanol, acetone Waste water treatment & municipal composting of Solid waste (large fermentation processes)		19 th Century 19 th Century
3	Introduction of sterility to biotechnological processes Mass cultivation/production of antibiotics, amino acids, organic acids, enzymes, steroids, polysaccharides, vaccines & monoclonal antibiotics		1940s
4	Applied Genetics & Recombinant DNA technology, traditional strain improvement of important industrial organisms, Recombinant DNA techniques together with protoplast fusion (genetic engineering)		1970s

Source: Smith (1996)

Area of Company Activity	Products
Therapeutics	Pharmaceutical products for the cure and control of diseases e.g. antibiotics, vaccines, gene therapy.
Diagnostics	Clinical testing and diagnosis materials in food, environment and agriculture.
Agriculture/Forestry/ Horticulture	Novel crops and animal varieties, pesticides.
Food	Wide range of food products, fertilizers, beverages.
Environment	Waste treatment, bioremediation, energy production.
Chemical Intermediates	Reagents including enzymes, DNA, RNA, specialty chemicals.
Equipment	Hardware, bioreactors, software and consumables.

Table 2: Company Categories Involved in Biotechnology

Modern Biotechnology and Animal Production

- The following are areas of modern biotechnology in animal production:
- Animal reproduction
- Animal artificial insemination (AI)
- Animal multiple ovulation and embryo transfer (MOET)
- Animal Cloning (1995 cloning from embryonic cells: 1996 Dolly cloned from adult non-embryonic sheep.
- Animal In-vitro fertilization
- Health
- Animal vaccines/vaccinology
- Animal growth hormones
- Animal monoclonal antibodies
- Animal genetic engineering for disease-resistant transgenic animals (transgenic)
- Animal diagnostics (Immuno-Assays, DNA probes and biosensors).

Animal Biotechnology in Nigeria

Biotechnology as a discipline is just being developed in Nigeria. As for animal biotechnology, only a few organizations are involved (Table 4). These and other related organizations should be coordinated to work in unison and avoid duplication and/or overlapping of roles and functions. Biotechnology in Nigeria as it relates to Veterinary Research and animal production should be emphasized in the following areas:

Artificial Insemination

Historically, the first documented artificial insemination in Nigeria was carried out at the Livestock Improvement Centre, Vom in August 1949. The semen was taken from Bunaji (White Fulani) bulls, which had come from the Agricultural Development Stock Farm at Shika, Zaria. Today the only artificial insemination centre in the country, which was established in 1976, is in the National Animal Production Research Institute of Ahmadu Bello University, Zaria. Artificial Insemination activities have witnessed a steady development in terms of infrastructure, acquisition of selected bulls and frozen semen, and field inseminations up

to 1995; however, decline and stagnation have since set in (Voh, 2004)

Table 3: World Market for Biotechnology Products (1981).

Product	Sales \$ (millions)	Projection for 2004*
Alcoholic beverages	23,000	36,800
Cheese	14,000	22,400
Antibiotics	4,500	7,200
Penicillin	500	800
Tetracycline	500	800
Cephalosporins	450	720
Diagnostic tests	2,000	3,200
Immunoassay	400	640
Monoclonal	5	8
Seeds	1,400	2,240
High fructose syrups	800	1,280
Amino acids	750	1,200
Baker's yeast	450	720
Steroids	500	800
Vitamins (All)	330	528
Citric acid	210	336
Enzymes	200	320
Vaccines	150	240
Human Serum albumin	125	200
Insulin	100	160
Urokinase	50	80
Human Factor VIII Protein	40	64
Human growth hormone	35	56
Microbial pesticides	12	19.2
Total	50,507	80,811.0

Source: Smith (1996). * 2004 Projections are made by multiplying by a growth factor of 1.6

If the Animal Production Industry in Nigeria is to make any meaningful progress, this all-important powerful breeding tool has to be resuscitated and made to function maximally on a sustainable basis. The details of how this can be done should be worked out in partnership between ABU, Zaria, Federal Ministry of Agriculture and Rural Development, organized animal production private sector, Nigerian Veterinary Medical Association and the Veterinary Council of Nigeria among others. The AI centre in Zaria should be made to function and possibly be commercialised to meet its national mandate.

To my mind, when this is successfully done, other important reproduction biotechnologies such as multiple ovulation and embryo transfer (MOET), in vitro fertilization (IVF), cloning, genetic engineering to produce transgenic animals for disease resistance can be systematically introduced as at when relevant.

Genetically Engineered Vaccines and Hormones

The production of genetically engineered animal vaccines has been a major success story in biotechnology in livestock-developed countries. The future for this type of disease prevention is immense and should be exploited. The relevant bodies, especially NVRI, celebrating 80 years of existence today, should take cognisance of this fact and take appropriate steps.

Biotechnological Diagnosis

The traditional analytical and diagnostic methods in Veterinary practice are time-consuming, expensive and fast becoming obsolete. New methods based on biotechnology-derived techniques are revolutionizing many aspects of diagnostics. They are faster, sensitive, carry out many determinations in situ, are cheaper, and more easily adapted to automation. Examples of some of these new technology-derived rapid diagnostic methods are immunoassays, DNA probes and biosensors. This is the way to go in Veterinary diagnostics in Nigeria as is

happening in other parts of the world. This should pose a challenge for the 21st Century.

Table 4: Organizations Involved in Animal Biotechnology in Nigeria

Organisation	Established
Artificial Insemination Unit (AI Unit), National Animal Production Research Institute, Ahmadu Bello University, Shika, Zaria.	1976
National Centre for Genetic Resources and Biotechnology (NACGRAB), Moor Plantation, Ibadan.	1987
Sheda Science and Technology Complex, (Shestco), Sheda-Abuja.	1993
National Biotechnology Development Agency (NABDA) Wuse, Abuja.	2000
Centre for Biotechnology, Research and Training (CBRT), Ahmadu Bello University, Zaria.	2004
Universities	1962-date

Information and Communication Technology (ICT)

Information and communication technology is simply a requirement for all human activities in the current globalisation process. It is certainly essential for research in animal production, animal health, and in provision of Veterinary services. Anybody who ignores ICT in today's world is doing it at his/her own peril!

The Way Forward

From the foregoing, it can be safely said that biotechnology is the challenge, solution and future of the Veterinary research and animal production in Nigeria for the 21st Century and should be approached in a systematic, coordinated and logical sequence. However, it should be known that, like any new thing, biotechnology has to be approached with caution. We must be mindful of the safety, social, moral and ethical consideration of biotechnology. This is another area of challenge to the Veterinary Profession even as we aspire to be "biotechnologically current". We must be mindful of the safety, social, moral and ethical considerations of biotechnology.

Animal health delivery systems should be drastically overhauled with most of it being delivered by private practitioners. Provision of Veterinary Services should be organized in such a way that more energy would be concentrated on prophylactic rather than curative medicine. Vaccination campaigns backed up by a system of early warning/early response on disease outbreak should be stepped up. Renewed efforts must be made to make available to pastoral producers genuine livestock drugs and medicaments at strategic locations within reach of the pastoralists (Getup, 1886). In particular, concerted efforts should be made to arrest the nagging problem of pre-weaning mortality, which could be as high as 32.8% in some ruminant animals. Applied veterinary research and development should, therefore, focus on diseases conditions of economic importance. The present conventional veterinary intervention can be supplemented by the ethnoveterinary practices of pastoralists and other livestock-raising communities. In this regard, it is important to investigate and document the wealth of

knowledge and experience of livestock owners regarding non-conventional methods of coping with livestock diseases and conditions in different ecological systems and under varying systems of management (Gefu et al., 2000).

Furthermore, inter-regional consultative groups of adjacent countries should be set up for the purpose of livestock disease monitoring and control. This is desirable considering the highly mobile nature of pastoral producers in the sub-region. To this end, therefore, the ECOWAS Transhumance protocol should be put to work.

Despite all the noble achievements, there are still a lot that can be attained if the right environment is provided. These include:

- Adequate and timely release of research requirements (incl. funding, material and human resources)
- Capacity utilization of locally-available resources for the improvement of livestock production
- Encouragement of private sector participation in R&D
- Substantial national appropriation for R&D of the sector (no less than 5% of total national appropriation)
- Development of bio-technology
- Extension research should be beefed up to bring the benefits of R&D to end-users.
- Definitive national policy on livestock research and development should be legislated and made to work
- Merited appointment of professionals should be made to key policy positions to move the sector forward.
- Effective utilisation of ICT

I call on the FGN to re-visit the dismal allocation to the Agricultural Sector of 2% in the national appropriation for 2005. Nothing short of 10% should be appropriated to the sector of which Livestock Sub-sector should get a significant share.

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FIRST PLENARY SESSION: EIGHTY YEARS OF VETERINARY RESEARCH & VACCINE PRODUCTION IN NIGERIA

Wisdom of the Ages: The Nigerian Experience and Challenges in the Art and Science of Vaccine Production.

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Introduction

I want to thank the organizers of this joint congress and anniversary for the opportunity to speak today. I am particularly excited because of the nostalgic memories this opportunity has evoked in me as I was privileged to be associated with Vom as a veterinary assistant-in-training at the end of its first quarter century of existence. Apart from the addition of a few buildings here and there, structurally there is not much change, but of course, functionally, a lot has happened. Let me therefore begin this reminiscing by heartily congratulating the Institute on this 80th anniversary, recognizing the contributions of the likes of Mr. Henderson, Mr. Thorne, Mr. Gamble, Mr. Shonekan, Drs. Ezebuio, Goni, Sansi, Lamorde, the incumbent Director (Dr. Lombin) and a host of other veterinarians and researchers too numerous to mention who made enormous contributions to put the Institute on the international map in the field of animal health management.

At this point, it is appropriate to recall that Veterinary services started in Zaria in 1913 but the core function was moved to Vom in 1924 to respond to the urgent need to limit cattle plague (rinderpest) which was ravaging the region at that time. Significantly, the new set-up in Vom had the responsibility to produce unlimited quantities of anti-rinderpest serum, suggesting at that time that management of the clinical disease was considered more urgent than prophylaxis. This soon proved an impossible task as the service lacked

manpower to cover the area of occurrence of the disease. Subsequent expansion of the mandate and mission of the institute necessarily had to be in response to the growing need to tackle not only the scourge of rinderpest but also other diseases, which had been diagnosed even if they were not as serious or urgent as rinderpest. With the onerous task outlined above there had to be a rethink on better and easier ways of managing the disease(s) with the limited resources – material and financial – available. Thus, the concept of disease prevention arose in preference to disease therapy. Vom was challenged! Vaccines had to be produced. However, what is a vaccine?

Technology

In the last decade of the 18th century (1795), Jenner had discovered that implantation of the live virus of cowpox in a person appeared to have protected him against smallpox. In addition, in 1881 Louis Pasteur successfully immunized against anthrax by implantation of “vaccine” which feat he repeated for rabies four years later. Thereafter the practice was extended to many other diseases. Vaccination was then recognized as the only successful alternative to direct exposure of persons to the disease itself, a system still in vogue in some Nigerian communities.

A vaccine may therefore be defined as a preparation containing weak or dead microbes, or parts thereof, which on injection into the body induces the reticuloendothelial system of the latter to produce specific antibodies that may drastically reduce the level of damage to the animal by the challenging wild microbe. Vaccination is the

deliberate introduction of this “modified” microbe into the body for protecting the animal against the wild invading microbe.

Traditionally there are two main types of vaccines viz: Bacterial vaccines and viral vaccines. Usually for the former, the bacteria are grown on solid media and floated in saline. Live (intact cells) bacteria may be used, or the organisms may be killed by heating the suspension in a water-bath at 60°C for 1 hour, or by addition of a chemical. The whole organism may be used or it may be fragmented by repeated freezing and thawing, by grinding, by use of ultraviolet irradiation, or by ultrasonic vibrations. Thereafter the preparation is tested for sterility and a preservative is added. Cell concentration is standardized and appropriate packaging is done.

For viral vaccines, the organisms must be grown in the presence of living animal cells. Cultivation in embryonated hen’s eggs was developed in 1931 by Ernest Goodpasture. However, it was not until 1949 that John Enders, Fredrick Robins and Thomas Weller revolutionized virus culture by introducing the culture of poliomyelitis virus in tissue culture.

The NVRI Experience

The effort of the pioneers in vaccine production in 1925 must be appreciated for it constituted the modest beginning of what now is. It is significant that the policy decision to start with the most prevalent and most dreaded disease—rinderpest—and the relative success achieved was a source of encouragement to venture into other disease problems. The achievement clearly put the profession on the map in the West African region, as Vom became a recognized centre for rinderpest vaccine production for the said region.

Lacking the technical facilities in the early years, the decision was to produce ‘wet’ vaccines – suspensions of the virus or bacteria in large volumes of the vehicle.

The bulkiness of the vaccines presented problems in transportation over long distances; the shelf life was necessarily short; the dosage voluminous and consequently the wastage associated with this operation was high. Given the above, there was an obvious challenge to produce less bulky rinderpest vaccine, thus the Dry Goat (Rinderpest) Vaccine (DGV) was born. Healthy goats were infected and monitored using the pyrexia that manifested in a successful infection. At the height of the fever, the goat was slaughtered and its spleen recovered aseptically. A suspension of the macerated spleen adequately processed including standardization and quality control constituted the vaccine, which was then lyophilized in dispensing vials (bottles).

The next challenge for the Institute was to develop similar prophylactics for the other major diseases of cattle in Nigeria. It is to the credit of the dedicated officers in the ensuing years that several vaccines were successfully developed. Vaccines were developed for bacterial and viral diseases like anthrax, contagious bovine pleuropneumonia, blackquarter, haemorrhagic septicaemia, rabies, fowl pox and fowl cholera, Newcastle disease, fowl typhoid, and in more recent times vaccines have been produced for pestes des petits ruminants (PPR), Gumboro disease and Brucella (S19). Innovations have included a freeze-dried form of live CBPP vaccine, and a dried form of fowl typhoid vaccine. These efforts are worthy of commendation. Even more commendable is the untiring search for improved vaccines.

In the 60’s an officer responsible for the production of anthrax spore vaccine observed that the stock anthrax spore was losing its potency. I recall that his diligent search in the field was rewarded with an isolate, which was adopted as the new and viable stock by the Unit. Much as we are adulating the Institute for these achievements this presentation will not fail to mention the occasional moments when its products have caused embarrassment to stakeholders,

especially the profession. Such occasions have included inadequate supplies, vaccines of doubtful quality in both potency and safety. Although these may be expected seeing that we are operating with some human factors, we must always appreciate that we are in the first instance concerned with life and also have a professional responsibility to maintain a reputation that has both sociological and economic implications.

Challenges

Laboratories all over the world have been concerned at various times with the economy of production. One of the concerns involves the packaging of vaccines. There are several examples of different vaccines being dispensed in the same vial if confirmation is obtained through research that there is no mutual interference with the ability of each vaccine to induce a homologous immune reaction. In human medicine, the well-known "triple" vaccine consisting of diphtheria-tetanus-pertussis micro organisms or measles-mumps-rubella viruses may serve as typical examples. In veterinary medicine viral vaccines of distemper-canine viral hepatitis with or without rabies, and the same combination with leptospirosis (Candivac DHL - Behringwerke) have been marketed.

Because the NVRI is the only institute charged with vaccine production, it will be necessary for studies to be undertaken to establish numerous opportunities for combined vaccines, for economy reasons.

Protozoal diseases constitute a high percentage of the diseases of livestock in Africa. We are aware that the need for development of suitable vaccines is of growing interest worldwide. The problem in most cases has been the determination of specific antigens that can induce immunologic responses. Evidence has been adduced to show that resistance to experimental trypanosome infection can be

produced if antigenically homologous trypanosomes are used for vaccination and challenge in the form of purified VSSA, irradiated whole parasite or killed parasite with adjuvant (Bevan, 1936; Johnson et al. 1963; Wilson, 1971; Lanham and Taylor, 1972; Murray and Urquhart, 1977). Some of this work had been done in laboratories in Africa. I believe it is time our reputed vaccine scientists got on board not only for protozoal diseases but also for the most important economic group of diseases; Helminthosis.

I would like to go back to the late 18th century when Jenner made the awesome discovery that dairy workers who were infected with cowpox virus became resistant to the wildest forms of small pox. By current knowledge the two viruses could be regarded either as antigenically similar or the vaccinia virus (cowpox virus) is a genetically modified smallpox virus to be able to immunize against the latter. The question is does this suggest a possible model for the ongoing search for a vaccine against human acquired immune deficiency virus (HIV)? Can an animal model or animal tissue be found that can either induce the virus to mutate or be attenuated sufficiently to be used for vaccine production? Can the methods used to develop Gumboro vaccine be adapted to develop the retroviral equivalent? No nation is insular in relation to the possibility of disease introduction. Nigeria with its extensive boundaries with other nations is particularly vulnerable. For example, the eradication of rinderpest and contagious bovine pleuropneumonia through aggressive vaccination has proved difficult because of the constant re-introduction of these diseases from Nigeria's neighbours. East Coast Fever (theileriosis) which was once thought to be too remote to constitute a danger to Nigerian livestock was once reported in Gabon and Eastern Cameroon Republic. With the vastly increased means of transportation between countries has been made easy, and so has the chance of exotic disease introduction. This challenging situation calls for increased vigilance on the

part of the profession. However, it also challenges our vaccine producers at NVRI and scientists in our tertiary institutions to engage in relevant research in emerging diseases that have the capability to threaten our livestock industry. There should be a strategic policy to produce and stockpile those vaccines that may be required at critical times of sudden introduction of exotic diseases.

The last challenge to be discussed is perhaps the most intriguing in the sense that it calls for adoption of new technologies for vaccine production. This is the use of recombinant DNA technology. Granted this depends on initial knowledge of appropriate genes, Murray et al (1974) reported that McDevitt and Denacerraf (1969) had demonstrated in mice that immune response (Ir) genes, located within the major histocompatibility complex (MHC) control antibody response to specific antigens. Describing the elusive trypanosome, Henson and Noel (1979) reported that successful vaccination utilized homologous systems in which the parasites with the same VSSA antigenic specificity are used for challenge. These and other reports suggest that protection can be realized even in this haemoparasite that is known for its notorious ability to mutate.

Summary

The author joins other participants to felicitate with NVRI on this occasion. We acknowledge your wonderful contributions especially in vaccine productions and associated research. As you gear up to perform more feats, we pray that you direct special attention to those modern

technologies that will help you remain relevant and competitive. Effort should be made by the profession to articulate the need for adequate and timely funding by the powers that be to realize this target.

Finally, Mr. Chairman I would like to tangentially mention that caution should be exercised in considering any proposition to privatize vaccine production in Nigeria in the foreseeable future for obvious reasons.

Thank you all for listening.

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THE ORIGIN OF VETERINARY RESEARCH AND VACCINE PRODUCTION IN NIGERIA

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Introduction

Nigeria before and after independence, has been an important former British Dependency in West Africa. The 80 years of Veterinary Research and Vaccine Production have been a continual technological activity, which antedated Medical Research in Nigeria. Therefore, the NVRI has been one of the early blessings and boons accruing from British Colonial Administration. A cursory history of NVRI attests to the veracity of this assertion.

The beginning of NVRI centred upon Rinderpest, the Cattle Plague. In the 19th century, the disease had usually been a sequel to war owing to the use of cattle as baggage animals. Africa was in turmoil in the middle of the 19th century and was riddled with internecine wars. For this reason, rinderpest introduced by the Europeans from Europe to the African continent via the horn of Africa in 1889, swept the whole of Africa and decimated the indigenous cattle and wild life. Veterinary Schools and Research stations were set up because of this dreaded disease in Europe and many colonial dependencies. NVRI was established in 1924 in Vom out of colonial self-interest. The primary aim and objective among other functions were to study rinderpest in Nigerian cattle, to devise methods to control it and establish surveillance to arrest its spread. In the ultimate, this meant the prevention of its resurgence in Britain. However, It must not be forgotten that soon after the eradication of rinderpest from Europe in 1950s, the disease was unwittingly re-imported to Europe from Africa via a zoo antelope (Scott, 1976).

Early Period 1924 -1964

The period 1924-1964 constitutes the colonial

phase and its legacy. The directives for running the NVRI were from the colonial office in London. However, all local field and research services were paid for by funds raised in Nigeria. Some account of expatriate pioneers who put NVRI on a solid footing and the breathtaking achievements of that period have been recorded in various Annual Reports of the Veterinary Department, Nigeria. Others are the Book of Proceedings marking the Institute's Diamond Jubilee (1984), the History of Veterinary School Vom, authored by Professor Shehu Bida, (*Marafan Nupe*) and Alhaji S. A. Sanusi.

With regard to the control of rinderpest by the Joint Project 15 of 1962 to 1976, the disease became eradicated from Equatorial Africa, which includes Nigeria (Williams and Masiga 1988). The activity of NVRI then had helped to contain the scourge of the most significant epizootic and epinortic disease not only in Nigeria but also in nations of Anglophone and Francophone West Africa including the Sudan. This period saw the end of the beginning of transfer of veterinary technology gradually to indigenous Nigerian workers by expatriate staff. After independence, the maintenance of the Institute inevitably became the prerogative of the Federal Government of Nigeria at a time of simmering political crisis.

Phase II: 1965 -2004

This period had been a time of consolidation and of limited or restricted expansion. The inputs of Nigerians on policy formulation and implementation brought about the placement of NVRI in several Ministries. Thus, its translocation

was inevitable and nomenclature has become changed. Before Independence, the Institute was initially known as the Department of Veterinary Research located in the Ministry of Information and Research. After Independence, the Department became known as the Federal Department of Veterinary Research, which was placed in the Ministry of Economic Planning and later on in the Ministry of Agriculture. To reflect the notion that Science and Technology transform the fortunes of a nation for the better, the National Veterinary Research Institute became its permanent label in the Federal Ministry of Science and Technology, whose Institutes numbered more than twenty. As of right, by old usage and tutelage under British Administration NVRI quite properly belongs to the Ministry of Agriculture of which it is an aspect. Within the Ministry of Agriculture, NVRI can be designed to make quick impact on socio-economic development by integrated extension services and by direct impact in the translation of research results to investors and entrepreneurs in livestock and poultry production. Nevertheless, the enhanced functions of the NVRI somehow enumerated in the 1970s are listed as follows:

- i. To improve, maintain and multiply the National Livestock and Poultry by producing various vaccines and biological substances used for prophylaxis, therapy or diagnosis of animal diseases.
- ii. To train cadres of intermediate manpower such as Ordinary National Diploma (OND) and Higher National Diploma (HND) in Animal Husbandry and holders of Associateship of Institute of Medical Laboratory Technologists AIMLT (London) and Laboratory Technician Proficiency Certificate.
- iii. To conduct research into animal diseases and their nutritional requirements.
- iv. To upgrade the national livestock and poultry, and to interbreed-them with exotic breeds to enhance their productivity. The NVRI used to import exotic breeds for distribution throughout the Federation for state governments and/or people who required them.

- v. To supervise regulatory duties on animal health problems throughout the Federation of Nigeria, and between Nigeria and other nations.

Undoubtedly, these assignments were too lofty and unwieldy. They needed to be redrawn, redecreed and streamlined so that other emerging institutes may share in these responsibilities to ensure effectiveness and efficiency. The second period actually began rather poorly owing to enormous drawbacks arising from political unrest and uncertainties in some parts of the Federation. This time witnessed the regrettable Nigerian civil war and its aftermath. The civil war affected NVRI in terms of the displacement of all categories of staff with the consequent stoppage of routine production and on-going research because some of the staff did not return to duty.

However, it is remarkable to note that, Dr. Musa Goni the first Nigerian Director organized quickly the NVRI to regain lost grounds. Nigeria joined in the Joint Project (JP) 15 for Rinderpest and JP 28 for Contagious Bovine Pleuropneumonia campaigns to control and eradicate these major epizootic diseases between 1965 and 1979 before their recrudescence in the 1980s (Osiyemi;1978 and 2001). The reasons adduced for the re-emergence of epizootics were slackness in veterinary services and more importantly, that governments had been unable to increase their budgets to meet increasing needs of their veterinary services (Williams and Masiga 1988).

NVRI contributed the vaccines needed to stamp out the two diseases. While rinderpest was finally stamped out by 1993-2001, some foci of CBPP remained in the North Eastern States of

Nigeria even though NVRI had enough vaccines to eradicate it. The successors to

Dr. Musa Goni were Dr. K.A.O. Sansi, Dr. A. G. Lamorde and the present incumbent Dr. (Mrs) L. H. Lombin, the first Nigerian Lady to hold the High Office. Because this period saw the post-war petronaira boom, NVRI expanded the training schools and created its outposts in many states

to bring NVRI activities closer to the Nigerian populace. Poultry production escalated and sufficient poultry vaccines could not be made with outmoded equipment and machines.

Research on streptothricosis under the impetus of Dr. Sansi was intensified. Research papers were numerous and their highlights would have remained latent in official files perhaps to be forgotten forever. However, Dr. A.G. Lamorde in the later middle half of his directorship gave wide media publicity to research findings, manufactured some drugs and ointments and freely marketed them. The innovation has been a fundamental departure from the protocol of the old civil service practice.

NVRI for General Adjustment

In the halcyon days of its existence, NVRI produced for Nigerian consumption beef, bacon, pork, goat meat, poultry meat, eggs and fresh pasteurized milk. The Nigerian Creameries in Vom marketed dairy products: butter, cheese, gee and ice cream of exquisite quality famous worldwide. By these efforts, NVRI show-cased the research fruits which private enterprise could commercialize as lucrative and profitable ventures in ecological zones feasible for such purposes e.g. Jos and Mambilla Plateaus for dairy and beef and in many places elsewhere Kano, Minna, Reaf area of Benue State and the southern states for piggeries. However, investors were scarce in those days as well as now to take advantage of these research findings and results for industrial productions. Nonetheless, Nigerians have realized the potential of NVRI to transform Nigerian agriculture into a nation that is self sufficient in all forms of animal protein production.

Nigerians regard NVRI as a quintessence of a Research Institute as they believe that all the experts reside in Vom to solve all the Veterinary problems of Nigeria and her neighbours. The policy makers have been slow to recognize that NVRI has been shouldering much responsibility using low budgetary allocation barely enough for proper performance of some of its functions. It was not a surprise in the post-independence era to see some of its functions being taken over by or transferred to other Federal Agencies of Government of the Federation such as the Federal Livestock Department (FLD), National Animal Production Research Institute (NAPRI), National Livestock Production Company (NLPC), Nigerian Institute For Trypanosomosis Research (NITR), Federal Department for Pest Services (FDPS) and Directors of Veterinary Services in the States.

The time has come to make NVRI the mother and spiritual home of all veterinary related Research Institutes. To meet the challenges of the 21st Century, such Institutes have to be created and established in different parts of the country. The NVRI would coordinate their efforts. NVRI erstwhile has been operating both as a research institute and as an industrial company manufacturing vaccines and biological substances. This generalist attitudinal posture belongs to the middle of the 20th Century of the pre-independence era. Even in human medicine today, the age of the general practitioner is fast disappearing. Specialists exist in all its branches and dominate practice. Their training is under the aegis of the Medical Council of Nigeria and its various Colleges of Postgraduate Studies. Similarly, Veterinary practice in Nigeria requires its own experts whose training cannot be left to the five faculties of veterinary medicine in Nigerian Universities. The Veterinary Council of Nigeria, nurtured

to independence and maturity by the Director of NVRI and its Postgraduate College of Veterinary Surgeons of Nigeria, like its Medical counterpart are poised to organize postgraduate qualification for veterinarians graduating from the Universities. The NVRI has been bequeathing sound professional practice as an indelible legacy to Nigeria. Judging from its pioneering efforts and its performance to date, the achievements of NVRI, considered in all their ramifications have exceeded the sanguine expectations of expatriate founders and Nigerians sustainers.

Mission and Visions

The mission of NVRI, starting from the time of cattle plague epizootic has been to ensure the welfare and usefulness of Nigerian Livestock and Poultry for food, export to earn foreign exchange, to provide by-products for industrial use and to safeguard the wildlife as a national asset. The partial fulfilment of the mission is not in doubt. The Agricultural Development of Nigeria (FAO, 1965) laid down structures and good plans as obtained before to cover the whole nation for effective delivery of veterinary services with the Director of NVRI as the Chairman of the Technical Committee, to implement the plans. Even though the structure is adequate, the plans have not been executed to achieve desired goals. Several reasons account for the lag. The figures on the population of livestock and poultry of Nigeria are based on unreliable and unsatisfactory guesstimates. Benjamin Disraeli a one-time British Prime Minister disapproved of such census figures on National Livestock and Poultry and observed that "*There are three lies: lies, damned lies and statistics.*" The Director of NVRI should, as a matter of urgency, obtain the accurate figures starting from the 774 local government areas of Nigeria. The present Head of State Chief Olusegun Obasanjo may catch her unawares requesting for them. These figures are useful in policy formulation and the planning of vaccine production and administration nationwide. Secondly, another factor affecting improper coverage of the whole nation by veterinary service is the lack of adequate numbers of Veterinary extension workers. These

personnel educate stock and poultry producers on the latest techniques on profitable productions. NVRI recommendations on beef herd management have remained unutilized (Osiyemi, 1982). The application of results of veterinary research for these reasons has become restricted. To illustrate further, the West African Milk Company WAMCO in Vom has taken advantage of NVRI research findings to produce dairy products profitably, if there is no outbreak of Food and Mouth Diseases and other things being equal. This disease is predictable in Vom. It affects dairy cattle in peal conditions and in my experience at Vom, it occurs whenever the local cattle are in low plane of nutrition consequent upon insufficient vegetation and forage. This occurs whenever the rainfall of the previous wet season is low. Therefore, about November to February months in some years local cattle trespass into NVRI paddocks to spread FMD rapidly among exotic breeds. As the antigenic type involved are known polyvalent vaccine from NVRI on request may take care of this outbreak before it occurs.

The 21st Century is crucial for Nigeria, because she has to make efforts to guarantee food, shelter and jobs for her teeming population by ensuring food security and avoiding food scarcity. Her Veterinarians and the other agriculturists are now challenged to provide wholesome animal protein. They together have to eliminate malnutrition and under nutrition and make, the slogan health is wealth a reality. A failure of Agriculture to make its contribution will cripple the entire developmental process in Nigeria (FAO, 1966). Therefore, the NVRI is to organize in the years ahead to eradicate all eradicable diseases of low incidence such as rinderpest, contagious bovine pleuropneumonia, brucellosis and tuberculosis until no future effort would be needed to prevent their reoccurrence.

In Veterinary Research, specialists are often needed to deal with some diseases of single species. In Europe and North America there are Institutes or Research Stations devoted to diseases of horses, dairy animals, dogs, fish, poultry, pigs, and wildlife.

Consequently, there are in those countries Equine, Dairy, Canine, Poultry, Porcine, Fisheries and Wild Life Research Stations. Stirling University near Glasgow in the United Kingdom has a Department of Aquatic Pathology headed by a Veterinarian. The NVRI and Veterinary Council of Nigeria and its appendage the Postgraduate College of Veterinary Surgeons, Nigeria (CVSN) should lobby the Federal Government of Nigeria for the creation of these Research Institutes as a matter of priority. The Wildlife Institute will cater for vanishing species such as the ostriches, dromedaries, giraffes and the elephant among others and it will be known as the Institute of Comparative Medicine and Physiology. Some of these Institutes have been proposed but not established (Ademosun, 1976). The Institute will collaborate with medical and veterinary research workers within and outside Nigeria. It is hoped that this Institute will safeguard the health of animals and make advances both in human and veterinary medicine. There is a famous motto: "*Tempora mutantur et illis temporibus tamur*: Times change and we are changed by those times."

The NVRI is now to reconsider its roles, which have to be modified or differ after eighty years, under the changing circumstances in the nation. The NVRI should be bold to make recommendations to keep out forever the rinderpest disease out of Nigeria. The last outbreak of cattle plague entered Nigeria via Chad, Cameroon and Niger. About 30 per cent of cattle slaughtered in Nigeria come from these countries (Ademosun, 1976). It has therefore become necessary to suggest the location of two research abattoirs so as obviate the entry of cattle from these countries to spread the disease. One of them can be located in Maiduguri and the other in

Sokoto. These abattoirs would be self-sustaining research abattoirs and would collect information on, and give effect to veterinary ordinance on trade cattle. They would protect the national livestock valued at 2,800 billion naira (Lamorde, 1996) from rinderpest and other epizootics. The abattoirs will generate employment on the network of distribution of dressed carcasses or processed beef. Some industries linked to them such as blood and bone meals producers would develop, multiplying the effects of these abattoirs. Since Nigeria can always control rinderpest by vaccination, the time has come for NVRI to organize now the next vaccination coverage for the entire nation as young susceptible cattle are building up. In the event of an outbreak, it takes about ten years before the affected cattle population regains its previous numerical strength (Osiyemi; 2001). No vaccine has been produced by genetic manipulation yet at the NVRI. But future research efforts will go along this line. When these high technology vaccines are available NVRI will devise them for field use if they are inexpensive and readily acceptable to stock and poultry producers nationwide. Such vaccines are among the challenges of NVRI for the future.

Conclusion

NVRI is the foremost Veterinary Research Institute in Nigeria. Its existence has stimulated the establishment of Veterinary Faculties in five Universities to train members for the Veterinary profession. However, the image of the profession in the eyes of the Nigerian public needs to be made better than it is presently in line with the image of the legal and medical professions (Osiyemi 2003). These two professions enjoy big favours from both the Federal and State Governments. They have political personalities ever ready to promote their interests and convince governments to allocate funds to them for perceived areas of need in the overall

interest of the nation. For example Dr. Bukar Shaib D.Sc. MRCVS FCVSN, a former Super Permanent Secretary for the Federal Ministry of Agriculture, and of FAO fame, easily comes to mind. In the USA, a professional like him serves as the Veterinary Surgeon-General of the Nation. He liaises with all Veterinary activities of the NVRI with the government of the Federation. Nigeria needs her own Veterinary Surgeon-General not only to pressurize for funds but also to arrange for such legislations that will make Veterinary Research serve the interest of the nation better. I have adumbrated on the history of NVRI as to research and vaccine production in the past eighty years. I have mentioned its achievements, successes and failures hitherto. The years ahead will witness how it will cope with the issues on emergent veterinary problems of the 21st century.

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80 YEARS OF VETERINARY RESEARCH & VACCINE PRODUCTION IN NIGERIA

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Introduction

The History of Veterinary research and Vaccines production in Nigeria for the past 80 years has been a very exciting and proud one and I am very delighted to have been a part of that history; and to be asked to review some of the progress made within that period. This could be a review of only some, not everything, as the time allotted to me could only allow a fraction of the progress made to be mentioned.

The livestock and poultry industry forms an important segment of our national wealth. As a national asset, NVRI, otherwise known in early days as Veterinary Laboratory, was mandated to conduct research into animal diseases and produce vaccines for their protection. Early efforts in this laboratory were made to produce such products that were purely crude in nature, and working relentlessly, these products were refined to the standard of pure vaccines that we know today. Research by the present workers is still going on at finding solutions to other problems that emerge from time to time.

Where animals are found you can expect there to be diseases that cannot be completely eradicated but can only be controlled and prevented for some of the time. With cattle, in particular we could recall three of the diseases that stand out foremost. These are Rinderpest, Contagious Bovine Pluero-Pneumonia (CBPP), and Trypanosomiasis. The last one forms a major activity of a sister institute. The question now is how far has the National Veterinary Research Institute at Vom tackled and achieved the mandate given to it?

The production of vaccines and sera and their injection into animals are the means by which

the immunization of animals is achieved. Before we arrived at the vaccines that are used today, let us go into the history of the efforts made to reach this level. In this regard, we take two of our most dreadful animal diseases.

Contagious Bovine Pleuropneumonia

Early efforts were made by pioneering research officers and other scientists in North Africa, East and West Africa. These workers included those that worked in the Veterinary Laboratory at Vom. Their first attempt was the active immunization of cattle with virulent lung fluid. Other early products were Formol 'vaccine', non-attenuated pure cultures, attenuated cultures in peptone-serum media, and immune serum. None of these crude products is now used in immunizing cattle. Relatively recent efforts were directed at using properly attenuated live vaccines.

About 52 years ago (1952), the Tanganyika (T1) strain of the CBPP vaccine was developed in fertilized hens' eggs as a freeze-dried vaccine. This vaccine was produced in liquid and freeze-dried forms in Vom as far back as 1970. Other attenuated vaccines are the V5 strain and the KH3J vaccine strain of *Mycoplasma mycoides*. Attempts at producing inactivated CBPP vaccine had not been successful even when adjuvants were incorporated. However, field

reports indicated the KHJ vaccine was a poorer immunization vaccine than the T₁ vaccine. This T₁ vaccine is the one being produced in Vom upto now.

Rinderpest Vaccines

The development of Rinderpest vaccines had a rather more fortunate history in that crude products were not used for immunization even

from the start. The first and the last attempts were pure attenuated vaccines; and at each successive vaccine was an improvement over the previous ones-being less virulent in tissue reactions and more efficacious. The Dried Goat vaccine was the first in this category and was used as early as 1932. Other attempts were at the production of Lapinised virus vaccine, Avianised virus vaccine, and Lapinised Avianised vaccine. Tissue culture Rinderpest vaccine (TCRV) was the ultimate in the development of anti-rinderpest vaccines. It replaced all previous vaccines and its development at Vom started in 1959 following the work of Plowright and Ferris in that year at Muguga Kenya. Kabete "O" Strain of the Rinderpest virus was attenuated in bovine kidney cells. After some further passages of the virus in Vom, the present TCRV was produced. The Dried Goat vaccine is being used as a challenge to test the potency of this vaccine.

Progress in Poultry Vaccine Production

The development of poultry vaccines started in Vom in 1948 with the Pigeon Pox vaccine followed later with Newcastle Disease vaccine Komarov strain. This is a rather very strong vaccine from the Mesogenic strain of the Newcastle disease virus. For administration of the vaccine to poultry, it has to be preceded by a mild strain in the Lentogenic group of the virus. To this end, the intra-ocular (B1) vaccine was developed in 1963 and was recommended to be given to day-old chicks. These two vaccines required individual handling of birds. A new vaccine that could be used for mass vaccination was therefore required. Efforts at the development of such a vaccine for Newcastle disease led to the production of the Lasota strain vaccine in 1968. The vaccine is recommended to be given in drinking water. It is a boom to the growing production of broiler birds.

The last addition to the poultry vaccine is the Gumboro vaccine. This came into use in 1978 when it was first issued to the field.

Still on poultry vaccines, attention must be turned to the production of Fowl typhoid vaccine. Looking at the vaccine production figures of the institute for some years,

consistently low production figures for this vaccine are noted. One is bound to ask question because the production of other poultry vaccines is on the increase. The very low figure for the fowl typhoid vaccine is not due to the inability of NVRI to produce, but rather due to the low demand from the field. The fact is that *Salmonella*-causing diseases are no longer controlled with vaccination but with very strict hygiene, the use of nitrofurans or a combination of some broad-spectrum antibiotics.

Production and demands of locally produced poultry vaccines are on the increase yearly; yet it is quite evident that the supply is not able to cope with the demand. This could be seen from the very large amount of foreign vaccines being imported into the Nigerian Market.

A new challenge to the livestock industry has arisen in recent years. African Swine fever has been devastating swine production in central and southern zones of the country. Efforts all over the World have not been successful in producing any vaccine against this terrible disease. It is hoped that the Veterinary Research Institute here will find alternative control measures against it.

International Recognition of Vom Vaccines

The high production standard attained and maintained over the years by NVRI, Vom has been recognized locally and internationally. As far back as 1945, the Nigerian Dried Goat vaccine was being used in Egypt and this use lasted up to 1963. The JP 15 campaign in Central and West Africa obtained its TCRV supply from Vom and this was reported to amount to over 10 million doses for the period 1962-67 it lasted. The Joint-project 28 against CBPP in Africa, which started in 1971, also had its vaccine supply from Vom. During the 1942-43 outbreaks of Black quarter in Cameroon, vaccines for the mass vaccination campaign was issued from this laboratory.

Thank you all for your attention.



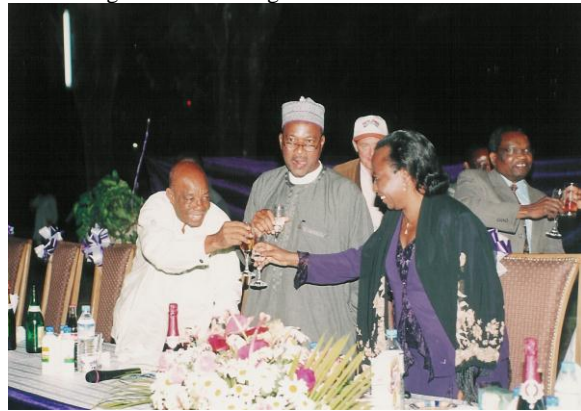
Cutting of the Anniversary Cake:(Center) , Chairman Opening Ceremony (Chief Audu Ogbe) being assisted by other dignities



NVRI Cybercafe: Commisioning of IT facility by the Hon. Minister of Agric. and Chief Audu Ogbe (Representative of the President, Fed. Rep. of Nig.) and other Dignities observing



New Digital Vaccine Freeze Drier :Commisioning of vaccine production equipment by the President 's Representative, Chief Audu Ogbe



Anniversary Dinner (R-L) Prof. Mba Uzoukwu, Dr. Haroun Yusuf and Dr. (Mrs) L. H. Lombin and Prof. B. O. Ikede



Visit to IDF, Vom: AVM Ishaya Shekarri (Chairman IDF Group of Companies) and the President 's Representative, Chief Audu Ogbe during visit to IDF with other Dignities



Variety Night: Jarawa Dancers of Plateau State

SYMPOSIUM: EMERGING AND RE-EMERGING LIVESTOCK DISEASES

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Introduction

Emerging diseases are those that are rapidly increasing in incidence or distribution. These include those diseases that are new (novel) as well as those that are re-emerging spatially or temporarily. Factors that may favour the emergence of such diseases may include those inherent in the host, changes in ecology, human demographics and behaviour, microbial alterations, improved diagnostic capability and capacity, increased rate and ease of travel and trade as well as a breakdown in public health measures. Many of the emerging diseases are zoonotic. It has been postulated that infectious agents may indeed exist in harmony in certain wildlife reservoirs without clinical disease. Under certain conditions, there may be sudden incursion of humans together with their livestock and domestic animals into such habitats and then such infectious agents may jump species and establish in a new host without previous experience and natural immunity or evolved resistance to the agent.

The importance of emerging animal diseases include the morbidity and mortality they may cause, the economic implications of control measures, the impact on trade in livestock and livestock products, public health implications as well as sociological and psychological impact on human populations. In most cases, national animal health authorities are unprepared for such disease emergencies hence the need for continued and constant update on important emerging animal diseases even when they have not been reported in a country like Nigeria. Examples of emerging animal diseases that may be relevant include those caused by the African swine fever virus, Nipah virus, Avian Influenza,

Rift Valley fever virus and the disease referred to as Bovine Spongiform Encephalopathy.

African Swine Fever (ASF).

African swine fever (ASF) is a highly contagious viral disease of domestic pigs, which was first described in Kenya about 1921. The disease was later seen in Southern Africa in free ranging domestic pigs as well as warthogs. African swine fever assumed prominence with its emergence in Spain and Portugal in 1957 and 1959 and in the Caribbean, Brazil and Sardinia.

In Nigeria although there is some evidence that an outbreak of ASF occurred in the country in 1973, the disease did not attract sufficient attention until 1997/1998 when the disease entered the country through Benin Republic and assumed epidemic proportions. ASF was also described in Togo in 1976, Cameroon 1982, Senegal 1978, Cape Verde 1960, Cote d'Ivoire 1996 Ghana in 1999 and recently in Zambia in April 2004.

The causative agent is a unique DNA virus, which can replicate in the vertebrate as well as the arthropod host. The natural hosts include domestic pigs, European wild boar. Warthogs, bush pigs and giant forest pigs may be infected without showing clinical signs and are involved in the maintenance of the disease.

In the Eastern and Southern African sub-regions, a sylvatic cycle involving warthog-tampans is known to be involved in the transmission whereas in West Africa where tampans are

absent a domestic cycle involving free ranging domestic pigs is said to be responsible for the dissemination of the disease.

The epidemic of 1997/98 in Nigeria involved Ogun, Oyo, Benue, Kaduna, Enugu, Anambra, Plateau, Bayelsa, Cross-River, Edo Akwa-Ibom, Rivers and Lagos States. In Benue State where serious efforts were made to quantify the effects of the disease, it was reported that 2,098 pig farmers in 157 wards of 23 local government areas were affected during the epidemic. 79,745 pigs in the state were affected resulting in the death of 61,298 of them.

The FAO of the United Nations put into place a Technical Cooperation Programme (TCP) for the control of ASF in Western Nigeria. A meeting was held in Abeokuta, Ogun State in 1998 and guidelines and recommendations were made for the control of the disease in Nigeria. A stamping out policy with compensation was to be adopted. Animal movement restrictions were also recommended. However, these were not effected due to some problems. These included the absence of a national ASF emergency preparedness and contingency plan, absence of legal support for stamping out policy, religious bias, unrestricted movement and scavenging system of swine production under the village set-up, traditional system of redistribution of animals and "fire-sales" in the face of disease challenge to avoid contagion and minimize losses.

The threat of ASF in Nigeria is not yet over. There is an urgent need to evolve contingency plans for dealing with ASF emergencies in the country. A national sero-surveillance of village pigs, wild pigs and survivors of the last ASF epidemics to determine possible foci of reservoirs is long overdue. Efforts should be made in conjunction with regional and world reference laboratories for ASF to carry out molecular characterization of Nigerian ASF virus isolates and determine their relationship to existing isolates from other part of the continent. A system for collection and dispatch of samples from the field to the laboratories should be established and the diagnostic capability and capacity in selected University

Veterinary Teaching hospitals should be enhanced to cope with animal disease emergencies including ASF. The status of *Ornithodoros moubata* in West African sub-region needs to be investigated and adequate but cheap pig housing and feeding to reduce scavenging of village pigs has to be developed. Efforts to determine the genetic basis of high resistance of some breeds of local pigs to ASF need to be given due support with the aim of breeding for ASF resistance in future.

Rift Valley Fever (RVF)

Rift valley fever is an acute mosquito-borne viral disease of ruminants and humans, caused by a member of the *Phlebovirus* genus of the *Bunyaviridae* family. Cattle, sheep, Goats, domesticated Asian buffaloes, camels and humans suffer clinical disease and some indigenous breeds tend to be more resistant than exotic species. The disease was first described in the Rift Valley area of Kenya in 1930 and periodic epidemics have occurred in South Africa, Namibia, Mozambique, Zimbabwe, Tanzania, Kenya, Sudan, Uganda, Mauritania Senegal and Egypt. The 1977-80 epidemic in Egypt involved as many as 200,000 humans with about 598 reported deaths. While the 1998 epidemic resulting from standing water from newly constructed dams in Senegal River basin may have caused up to 224 deaths among humans.

In Nigeria, RVF virus was isolated from arthropods in the 1970s and serological evidence if infection has been documented although clinical RVF has not been described.

RVF virus circulates between vertebrates and mosquitoes. In endemic or maintenance phase of RVF, the virus circulates between vertebrate hosts and primarily zoophilic aedine mosquitoes and there is little evidence of animal disease. Instead sporadic human cases may occur as occupational hazards through handling of infected tissues, blood, secretions and excretions of infected animals or through the laboratory.

In epidemic phase, secondary vectors like culicine and anopheline mosquitoes become infected and help spread the disease to livestock and humans. In this phase clinical disease is apparent in susceptible animals and peridomestic anthropophilic vectors like the *Culex pipiens* may become infected and help spread the disease (vector-borne spread).

Factors that are importance in the evolution of RVF include massive increase in vector populations, introduction of susceptible exotic breeds and presence of the causative virus. Increased vector populations may follow accumulation of breeding sites in standing water following abnormally heavy rains and flooding or disease may be associated with irrigation channels and dams.

Avian Influenza

Avian Influenza (AI) is a viral disease of poultry, which may vary from very severe to mild disease. Avian Influenza viruses belong to the *Orthomyxoviridae* and based on differences in the nucleoproteins and matrix antigens are classified into types A, B and C. They have been sub-typed based on antigens of the haemagglutinin and neuraminidase proteins into 14 H and 9 N sub-types. All type A AI viruses that cause disease in poultry belong to H5 and H7 especially H5N7 and H7N2 sub-types.

The natural hosts are the domestic chicken, ducks geese, turkeys, guinea fowl and pheasants. However, disease outbreaks occur most commonly in domestic chickens and turkeys. Infection in wild birds tends to be sub-clinical.

It has been suggested that many of the strains that circulate in wild birds especially water birds are mildly pathogenic for domestic chicken. Virulent strains may emerge by genetic mutation or by re-assortment of mild virus. Humans may be infected with H5 avian influenza virus as occurred in Hong Kong in 1997. The disease has been reported in Thailand, Vietnam, Cambodia, Malaysia, Indonesia, South Africa and recently in Russia.

Infected birds shed the virus in secretions and excretions and spread may occur within and in-between flocks by contaminated equipment, movement of birds as well as by movement of birds. Airborne transmission may also occur. Although the possibility of vertical transmission has not been proven beyond doubt, broken contaminated eggs may help spread the virus after they hatch in the same incubators. In highly pathogenic AI, the disease may occur suddenly marked by depression, weakness, and staggering gait, ruffled feathers, laying of soft-shelled eggs or even cessation of laying.

Although the disease has not been reported in Nigeria, AI must be considered in the differential diagnosis of Newcastle Disease. Infectious laryngotracheitis, acute poisonings as well as acute fowl cholera and other septicaemic poultry diseases. Unrestricted importation of chicks and parent stock may serve as possible source of introduction of AI into the country. There is an urgent need to develop contingency plans for dealing with AI emergency in the country.

Although inactivated vaccines are available for reducing mortalities, preventing disease or both are available; they may not prevent infection in some individual birds. Until the AI types and sub-types circulating in Nigeria have been identified, it may not be wise to adopt vaccination strategy in the country. To be able to achieve this serious effort should be made to harness the expertise that exists in various universities to support research and diagnostic efforts in the NVRI, Vom. Any suspected cases should be thoroughly investigated given the importance of AI. Specimens to be collected aseptically should include tracheal and cloacal swabs, brain, tracheal, spleen and intestinal contents. It is advisable to make impression smears from internal organs including the pancreas and kidneys for detection of viral antigens.

Nipah Virus

This virus disease was first reported in the Malaysian Peninsular in September 1998

and May 1999 in pigs and humans. The disease in pigs was highly contagious and was characterized by acute onset fever, respiratory signs and in some cases nervous signs. Some pigs died without premonitory signs while in humans, the disease manifested in nervous signs, headache, myalgia, drowsiness and coma. About 115 human deaths were recorded during the outbreak. Majority of the human cases were in people associated with the pig industry and who had direct contact with infected pigs.

The causative agent was later identified as Nipah virus which is related to a previous virus (Hendra virus) isolated from horses and humans who died of a strange disease in 1994 in Australia. This virus has been isolated from dogs and cats. Horses in the area are known to have neutralizing antibodies to Nipah virus while virus antigen has been demonstrated in horses by immunoperoxidase technique.

Apart from zoonotic considerations, approximately 1.1 million pigs were culled in an attempt to contain the Malaysian outbreak, the government paid US\$ 35 million in compensation, about US\$ 146 million was spent on control programme, estimated US\$ 105 million lost as tax revenue from the pig industry and about 36000 people lost their jobs. The fruit bats of the genus *Pteropus* have been shown to be the natural reservoir host of the virus.

Bovine Spongiform Encephalopathy (BSE)

The disease commonly referred to as Mad Cow Disease was first reported in the United Kingdom in November 1986. The disease is characterized by behavioural changes, alteration in mental state, abnormal sensation and ataxia. It affects mainly adult cattle about 4-5 years old. Although there are different opinions on the nature of the causative agent, one thing that is clear is that the source is meat and bone meals fed to cattle. Apart from the impact on cattle production and trade, BSE was thought to be responsible for the new variant transmissible spongiform encephalopathy of humans Creutzfeldt-Jakob disease (CJD). This is yet to be proved beyond doubt.

It has been suggested that a component of the causative agent is a post-translational form of the normally produced PrP protein. The normal form is referred to as PrP^c while the ones associated with disease are called PrP^{sc}, PrP^{BSE} and PrP^{PRES}.

Basic epidemiological observations with well thought-out deductions led to the discovery that the disease was introduced through meat and bone meals through a change in the rendering process from batch processing to continuous system as well as a reduction in the use of hydrocarbons solvent to extract tallow. Both factors may indeed have favoured the survival of the BSE causative agent in meat and bone meals.

Apart from cattle, BSE cases were also seen in domestic cats, Nyala, Gemsbok, Arabian oryx, Greater kudu, Puma, Eland, Cheetah, Tiger and Bison in the UK during the outbreak period. Outside the UK, BSE cases were also reported in indigenous cattle in Belgium, France, Ireland, Luxembourg, Netherlands, Portugal and Switzerland, as well as in imported cattle in Italy, Oman, Germany and Canada. The implications of BSE for Nigeria may not be significant. Firstly, majority of our cattle are grazed on natural pasture and there is hardly any form of concentrate supplementation for beef breeds. Meat and bone meals are mainly used in poultry and given the rather long incubation of BSE, the disease is not likely to establish in poultry. However, commonsense would seem to favour use of locally produced bone meal in the country.

The Way Forward

Emerging animal diseases tend to appear suddenly in a given area without warning to national veterinary authorities. The economic, sociological, political and human impacts in the case of zoonotic ones, often depend on how early these diseases can be detected before evolution into full-blown epidemics as well the preparedness of each country to cope with such disease emergencies. It has therefore become very necessary for Nigeria to commission expert-

led risk analysis of major emerging diseases that could be introduced into the country through animals and livestock products, establish the likelihood of spread and persistence of such a disease after introduction. It is highly desirable that national contingency plans for dealing with emerging as well as other transboundary animal diseases be developed as soon as possible. It is also being suggested that the obsolete animal health laws in the country be reviewed and appropriate legislative backing be given to enhance the effectiveness on control measures.

Since in most cases of emerging animal diseases, vaccines are either not available or for not be advisable because of risks of introducing hitherto non-existence strains of these pathogenic organisms, stamping out with compensation option may have to be adopted in dealing with these diseases, the country may have to device ways of encouraging, sub-siding and enforcing animal health insurance schemes arranged preferably, under livestock cooperative organizations. There has been remarkable increase in the numbers and types of peri-urban livestock farms with the resultant close proximity of many farms to human populations. This situation has serious implications should an emerging animal disease emergency occur. Various state and local government authorities have to re-visit the issue of approval and location of livestock farms in future.

Globally, there are probably about ten major animal disease high security laboratories capable of handling highly dangerous exotic pathogens. These are:

- The Plum Island Animal Disease Centre, Greenport, New York, USA
- Institute for Animal Health Laboratory, Pirbright, Surrey, U.K
- Commonwealth Scientific and Industrial Research Organization Division of Animal Health, Geelong Victoria, Australia
- National Centre for Foreign Animal Disease, Winnipeg, Manitoba, Canada
- Statens Veterinære institut for Virusforskning, Lindholm, Denmark

- Federal Research Centre for Virus Diseases of Animals, Paul-ehrlich-strasse, Germany
- Institute for Animal Science and Health, Central Veterinary Institute, Lelystad , Netherlands
- Centro de Investigacion en Sanidad Animal, Madrid, Spain
- Institute of Virology and Immunoprophylaxis, Mittelhausern, Switzerland and
- Onderstepoort Veterinary Institute, Onderstepoort, South Africa.

These security laboratories carry out work on highly infectious and dangerous pathogens without risk of their escape to the outside environment or risk to workers in these laboratories. As the National veterinary Research Institute celebrates its 80th Anniversary, is it not high time we made an attempt to develop high security facilities within the Institute to handle cases of emerging and epidemic Transboundary Animal Diseases. Since many of these emerging animal diseases are zoonotic, and in attempt to pool together resources and save cost and enhance efficiency, I will like to propose that such facility should be combined animal/human diseases high security laboratory. Such a laboratory would be expected to be actively involved in diagnosis, research, provide training, advice to government and international donor/trade countries as well as serve as vaccine banks for animal and zoonotic diseases emergencies.

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EMERGING AND RE-EMERGING LIVESTOCK DISEASES: LESSONS FROM THE CANADIAN EXPERIENCE

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Introduction

I join others in congratulating the National Veterinary Research Institute (NVRI), which is celebrating 80 years of service to Nigeria in particular. I also congratulate the Nigerian Veterinary Medical Association (NVMA) as co-organizers of this special event. In May last year, I was pleasantly surprised to receive a letter from the NVRI Director, Dr. Lami Lombin, asking for some advice in planning for this event. I thank her and the local organizing committee for inviting me all the way from Canada to participate in the celebrations and this symposium. I also seize this opportunity to thank the College of Veterinary Surgeons of Nigeria for electing me a Founding Fellow about 10 years ago.

Before I moved to Canada 15 years ago, my research at the University of Ibadan was focused on diseases limiting livestock production in Nigeria, with special reference to Trypanosomosis, Pestes des Pettit Ruminant (PPR) and management problems. In 1987, I was privileged to give the Ibadan University lectures which I titled "The Nigerian Livestock Industry: Assets, Liabilities and Potentials". I stated at that time that as a country, Nigeria had rich livestock assets and potentials, but was not adequately dealing with the industry's liabilities, some of which were animal diseases, animal production systems and the quality of veterinary education. My first question today is what progress has been made in Nigeria since that time?

Emerging and re-emerging livestock diseases contribute to low productivity of

livestock everywhere. The importance of this factor in the Nigerian livestock industry and in public health is best assessed by scientists and professionals living in the country. I am aware of the havoc created by newly emerged African Swine Fever (ASF) in Nigeria and other parts of sub-Saharan Africa. But a disease can be truly said to be "re-emerging" in a country only when it had been previously controlled effectively or eradicated in that country. Other than rinderpest, how many such diseases have been controlled in Nigeria? Furthermore, the emerging diseases being described today appear to be more important in commercial livestock production systems of the developed world. What is their impact on the subsistence/nomadic Fulani herdsman and women who are still the main suppliers of Nigeria's meat, milk, egg and fibre?

However, we must not be myopic in our view on animal and human diseases. Climate change, international travel, international trade, and terrorist activities all combine to force us to acknowledge that we belong to a global village. In the developed countries, improved animal production methods have reduced the incidence of certain diseases, but improvements have also led to new diseases related to huge farm sizes. For example, the Canadian beef industry is facing its greatest challenge ever because of drought in 2001 and 2002 (an old problem, quite like in Northern Nigeria), followed by BSE in 2003 (an emerging disease). We have also experienced outbreaks of *Escherichia coli* 0157:H7 infection in humans in Canada, traced to cattle manure from large dairy farms contaminating drinking water or food. West Nile virus fever, transmitted by

mosquitoes, has spread from the United States to almost all Canadian provinces since it was first diagnosed in New York State in 1999. These diseases are occurring in spite of very advanced veterinary medical practice and surveillance protocols. As a net importer of meat and milk products, what is Nigeria doing to ensure that the problem of endemic diseases is not compounded by temperate diseases through importation?

I would like to spend the remaining minutes to summarize how Canada has been affected by three of these diseases, and what lessons may be applicable to Nigeria in dealing with the country's endemic, emerging and re-emerging animal diseases.

Canadian experience with FMD

FMD is present in virtually all continents except North America. The last outbreaks occurred in the United States in 1929, Canada in 1951-1952, and Mexico in 1946-1954. In 2001, the United Kingdom experienced a devastating outbreak of FMD. Canada banned livestock products from the UK and imposed stringent travel restrictions to and from there. Veterinary schools cancelled visits of guest speakers from the UK at the last minute and even a Royal visit to Canada in 2001 was affected. Stringent measures were also taken at airports and all border crossings. At that time, some people argued that the precautions went overboard, but at the Atlantic Veterinary College, the policy was that it was better to be safe than to be sorry. Consequently, despite the volume of traffic between North America and the rest of the world, that continent has remained free from FMD for at least 50 years.

Canadian experience with BSE

Half a century of success with FMD has not adequately prepared Canada for bovine spongiform encephalopathy (BSE or mad cow disease). When the disease was diagnosed in the UK and traced to management practices involving improperly processed animal products in feeds, Canada took the usual stringent steps

of banning importation of live cattle from the UK. In addition, following the detection of BSE in 1993 in one cow imported from the UK, we traced and slaughtered all cattle (and their off springs) imported from the UK during the period at risk. In 1997, we banned the use of ruminant products in feeds meant for ruminants and stepped up surveillance for BSE. We thought we had done everything right. Then in May 2003, one cow was diagnosed with BSE in a farm in the Province of Alberta, Western Canada. Immediately, many countries placed a ban on the importation of livestock and meat products from all over Canada, a distance of about 7,000 km from east to west! Even though the livestock production systems in Canada and the United States are integrated and virtually identical, the US refused to open its borders to Canadian livestock for almost a year. To make things worse, the US diagnosed their own single case of BSE in December 2003 and showed that the cow was imported from Western Canada. By late 2004, the US was allowing meat but not live cattle from Canada. Because the US is the main market for Canadian beef and cattle export, the loss due to the two cows with BSE has been estimated to be around CDN\$8 billion or about \$2 million a day in the first year. Between April and September this year, the Canadian government has allocated nearly \$1 billion to assist the industry overcome the crisis, increase surveillance, and provide lasting solution to the glut of beef animals in Canada. Meanwhile, the price of beef in the country has not fallen! In other words, even though cattle farmers (producers) are selling their animals cheaply because of the glut, the businesses controlling abattoirs and meat retail markets have maintained artificially high prices to the bewilderment of consumers.

Canadian experience with HPAI

Apart from the United States, Asia is probably the greatest trading partner with Canada. Western Canada, especially the Province of British Columbia, has very large populations of citizens of Chinese, Japanese and Indian origins. During the Severe Acute Respiratory Syndrome (SARS) outbreaks

over a year ago, Canada had the highest number of casualties outside Asia and this was partly attributed to the volume of international travel between Canada and Asia. Another factor was poor preparation and uncoordinated response by public health authorities. In February 2004, Canada had an outbreak of highly pathogenic avian influenza in one farm in British Columbia. For a number of reasons, the outbreak quickly spread to other farms. Control was eventually achieved through the slaughter of all birds in the affected area, including forced slaughtering of healthy birds, claiming the lives of some 19 million birds in that Province. The source of the outbreak is not yet determined, but there is no evidence to date to suggest that it originated from similar outbreaks in Asia. There is even a suggestion that it could have been a mutation of an endemic low pathogenic virus strain. The failure to stamp out the disease before it spread to more farms is being blamed on many factors, including poor coordination between Federal, provincial and municipal authorities, improper handling of the disposal of dead birds and litter, inadequate bio security between farms, and failure to get the poultry industry involved.

Lessons for Nigeria

1. Emerging and re-emerging diseases do not respect political boundaries or geographic barriers. We live in a global village and what affects our neighbours may soon affect us.
2. Some of the diseases emerging in the developed world originate from endemic foci in developing countries, which do not have the means or the will to eradicate them. On the other hand, some, like BSE, originate from the developed world and could be spread to developing countries through importation of livestock products or live animals to upgrade local stock.
3. In spite of advanced facilities and trained personnel, new infectious diseases continue to emerge

everywhere, in some cases, facilitated by over intensive livestock production that leads to over concentration of animals in a small area. The larger the farms, the greater the economic impact of such diseases.

4. In emergencies, whatever can go wrong will probably go wrong (Murphy's Law). The UK experience with FMD in 2001 and the Canadian experience with BSE in 2003 and with HPAI in 2004 prove the point.
5. Canada's vulnerability in the beef and cattle industry is largely due to the fact that most of the products are exported to one country. With just a single case of BSE detected after intensive testing, Canadian beef is safe and is being consumed in the country. Therefore, the ban by the US is generally believed to be political rather than scientific.
6. As a major importer of meat and milk, Nigeria may not suffer similar immediate consequences when there is an outbreak of an emerging or re-emerging livestock disease that is not highly fatal or contagious to humans. However, should the "giant of Africa" remain in such a dependent and vulnerable position of importing food? This is my last and big question. I hope that this symposium and others will provide insight into how Nigeria's livestock industry can be modernized, safeguarded, and become economically viable.

Addendum/Concluding Questions

For further discussion, here are my questions again.

1. What progress has been made to improve livestock production and veterinary education in the last two decades?
2. Other than rinderpest, how many other major livestock diseases have been controlled in Nigeria during since the 1980s?

3. What is the impact of emerging and re-emerging livestock diseases on nomadic Fulani herds?
4. As a major importer of meat and milk products, what is Nigeria doing to ensure that imported diseases do not compound the problem of endemic livestock diseases?
5. With all the available resources, should Nigeria continue to be an importer of food?

I thank you all for your attention.

SYMPOSIUM: QUESTION & ANSWER SESSION

Name Prof. A. G. Ambali
Address: Dept. of Vet. Med. Univ. of Maiduguri

How can we harness our human and material resources to minimize the syndrome of scientists rushing out (abroad) to analyse samples (virus isolation, etc). I think we have well trained staff all over the country.
Thanks

Name Dr. O. L. Obasi
Address: University of Uyo, Uyo
Due to BSE in Canada, there was "a glut in Beef animals but no change in Price". What other law of economics supported this other than SUBSIDY. International agencies advocate de-regulation and the supremacy of market forces in the economies of developing countries. What is your stand?

Name Dr. O. S. Adeyemo
Address: Nigerian Agric. Insurance Corporation, Abuja.
My comment is on insurance approach to the control of ASF. Currently ASF is excluded under piggery Insurance Policy for the following reasons:

- The risk is always catastrophic i.e. total loss of the animals, which is too much on the insurance.
- High incidence of moral hazard experienced generally in Livestock insurance.

- Nigerian Agric. Insurance Scheme believes that the risk is a certainty and should be borne by the government.

Way Forward
Slaughter and Compensation should be adopted
A special fund should be set apart which can be managed by financial institutions for this purpose.

Name Dr. M. Isikalu
Address: Vet. Dept., Min. of Agric., Ogun State
The Nigerian Government should be sincere when policies are made. A very good case is the pronouncement of government to pay compensation to farmers who were victims during the ASF crisis but none ever came. If there had been compensation, many farmers would have disposed of the in-contact pigs, disinfected and rested their farms hence a re-emergence of ASF would have been avoided.

Name Prof. S. S. Baba
Address: Faculty of Vet. Medicine, Uni. Maid.
I wish to commend the speakers (especially Profs. Obi and Ikede) for their emphasis on the need to establish a maximum security Bio safety (Level IV) laboratory for handling human and animal special pathogens like the highly

pathogenic influenza virus, Ebola, Lassa fever, Rift Valley Fever, SARS etc. In addition, a bio safety level III facility could be installed in each of the six geopolitical zones in the country to handle highly pathogenic endemic and some sporadic diseases like African Swine Fever, Rinderpest, Blackquarter, Foot and Mouth Disease, Lassa Fever etc.

What is the status of vaccine development for African Swine Fever? In the design of ASF vaccine, consideration should be given to thermo stability of the vaccine and the need to adapt such vaccine to feed and water for effective administration of the vaccine to the scavenging pigs in this environment. What is the prevalence of African Swine Fever virus in *Ornithodoros moubata* tick?

Name Dr. Muhammed Abba Kwajaffa

Address: Borno State Agric Dev. Programme (BOSADP) Maiduguri.

Most of these emerging diseases, their sources are not determined and there is the blame game of what is responsible and who is responsible for a particular emerging diseases. Only two cases of BSE were traced to Canada and there was a total ban on Animal and Animal products from Canada and the ban is still on in respect of the above statements. Could emerging diseases be a

laboratory-manufactured disease for some countries to boost their economy and for others to fail economically?

I do not want to use genetic assortment in laboratories but prefer genetic modification because there is a human interference by playing with the pathogenic agents to produce a new disease. Could emerging diseases be a way of killing manpower in human population and animals for the super powers to continue to thrive well in all aspects of human endeavour?

Can genetically modified (GM) food be a cause of an emerging disease?

Name Prof. King A. N. Esievo

Address: ABU Zaria

Our state of preparedness to solving control strategies for emerging of re-emerging diseases is hampered by some "political" manoeuvring from scientists, veterinarian and government officials. The Need to discuss BSE was initiated by my humble self, over eight (8) years ago. If this were accepted, a lot of information on BSE would have been available to FLDPCS for international use (as required of now). We should blame ourselves too.

Name Dr. A. Abdullahi

Address: Dept. of Agric. Science, Fed. Min. of Agric. Abuja.

It is instructive that we as professionals know what the problems are but we are yet to galvanize our collective strength to overtake full opportunities of these

emerging diseases to make a statement of our role in the national economy.

For example the dangers pointed out by Prof. J. U. Umoh on consumption of all forms of meat peppersoup (offal, goat head, cow head, Bokoto, bush meat etc) in relations to the emergence and or transmission of BSC/CSD, only those of us who are professionals know about it. We therefore need to aggressively publicise and create awareness on this and many emerging diseases. Indeed, emerging diseases would continue to be major global and national issues of public health, there is need for veterinarians and their institutions to continue to emerge from our present sloppy and timid source to assert our values and contribution to be national economy.

Name**Address:**

Dr. A. G. Malgwi
ECWA Rural Dev. Ltd. Jos
How did the Canadian govt. manage to maintain same price in time of glut because of the export ban on beef? Prof. Obi stated that 79,745 pigs were affected by ASF in Benue State out of which 61,298 died. Were these pigs really affected (infected) or in-contact or were these the pig population in the affected LGCs or was there a laboratory diagnosis to ascertain these submission i.e. real infections of 79,745? Are these pigs now carriers and if so what next?

Name**Address:**

What solution can Prof. Obi proffer for the "five-sale" syndrome in situations like this?

Prof. Saka Nuru
P. O. Box 1630 Zaria
Free-range management of cattle of either ruminant or ranching system does not prevent us, as a nation, to export meat to other countries, if we can adequately control diseases especially Zoonotic ones. With our up-to-date research findings on animal production since the 1970s on new techniques of production. The productivity of cattle for meat has tremendously increased per head per hectare. So do not let us be pessimistic about our potential to export meat and meat products.

Laws or regulations exist in Nigeria on importation of live animals and animal products but even the highly educated and highly placed Nigerians go abroad and bring in any species of animals they like polo horses, sheep, and exotic cattle for dairy and for beef production without ever consulting veterinarians. We as vets. need a lot of work to do to educate Nigerians in this respect; otherwise, we will bring in exotic diseases.

Name**Address:**

Dr. P. A. Abdu
ABU Zaria
Please comment on the relationship between HIV and Human and animal TB and cryptosporidiosis.
Most of the emerging diseases are Zoonotic. I

wished that our medical counterparts were present at the discussion for interdisciplinary approach to Zoonotic diseases.

Thank you.

Name

Oba (Dr) K. A. O. Sansi

Address:

Aafin, Esure, Ijebu-Imusu,
Ogun State

There are laws on the statute books (Animal Diseases Act) regulating the importation and exportation of animals from and to Nigeria of disease (exotic, emerging etc) into the country. Unfortunately, these laws are not obeyed and are broken at will. It would appear also that governments in Nigeria are not bothered about keeping surveillance regarding outbreaks of disease in the country and importation of diseases from outside.

In addition, a disease like Foot and Mouth Disease is endemic in Nigeria and since there is no policy to eradicate it, it is advisable to vaccinate imported exotic cattle from the country of origin.

Veterinarians should do their best to ensure that appropriate actions are taken when outbreaks are reported and should not collude with owners of diseased animals who employ dubious methods to dispose of such animals.

Name

Dr. R. T. Sadiku

Address:

P. O. Box 28185 Agodu
Ibadan LMC Vet Sero. Bloc
C. No. 12 Imo Road Ibadan.

The government should be encouraged to employ veterinary doctors for meat inspection since some states do not have veterinary doctors. Meat being consumed since they are not being inspected cause the spread of diseases of Zoonotic importance such as tuberculosis, brucellosis etc.

Private veterinary doctors should be involved in meat inspection and the NVMA should make public announcement against any state that does not employ veterinary doctors that the meat being consumed in the state are unwholesome for human consumption.

Name

Prof. D. V. Uza

Address:

Uni. Agric. Makurdi
The Federal Department of Livestock Abuja could borrow a leaf from the Federal Government's Policy on compensation with respect to CBPP and quickly develop a policy on African Swine Fever compensation.

The Veterinary Curriculum does not seem to address the question of inter-relation and disease because the students are not trained enough in the area of management and production.

How is research addressing village chickens towards coping with avian influenza?

Name

Dr. Balogun

Address:

The policy of the present-day government is to stimulate livestock production in Nigeria. And this has led to

many small-scale holdings of livestock. Many of these livestock farmers do not observe the critical bio security measures. What does this portend for the livestock industry if this practice continues? How can NVMA alert the public about the public health implication?

Name

Dr. Chuks Onah

Address:

Jos Plateau State

Dogs are close companions of man and we love only imported dogs in this country. Is there any possibility of mutation leading to some disease agents which are not pathogenic in there species emerging to disturb man. We do not seem to be focusing on canine species.

Name

Dr. N. D. G. Ibrahim

Address:

A. B. U. Zaria

Please, call on our professional colleagues

who are directly with governments at federal, states and local government levels to check the practice of contracting our abattoir management to individuals or companies. The practice undermines our professional ethics and is a serious setback to disease control, especially that there are now emerging diseases.

Name

Dr. D. N. Onah

Address:

UNN

Re-assortment of virus in pig and man (Avian flu). What about re-assortment in the laboratory?

God is a Nigerian, no bio security, no monitoring and no government will

BSE, Prion Protein, altered host protein. How did feeding of cattle with sheep and lead to this? Is prion protein the aetiological agent of scrapie?

CITATIONS FOR NVRI DISTINGUISHED LEADERSHIP AWARDS

DR. MUSA GONI, MRCVS, FCVSN

Dr. Musa Goni (VCN No. 18) trained as a Veterinarian at University of London, graduating in 1961. He served as a Veterinary Officer in the then Government of Northern Nigeria. In 1967, he was deployed from the Regional Service to the National Veterinary Research Institute, Vom, for an initial period of 6 months but was later confirmed the First Nigerian Director of Veterinary Research and consequently, the first Nigerian President of the Veterinary Council of Nigeria (VCN). Major developments in the postcolonial era in Veterinary research were to his credit. Notably during the civil war period, he along with a small group of staff kept research and vaccine production going full steam. Dr. Goni's fatherly supervision encouraged research staff of whatever tribe, to strive to achieve their full potential during his tenureship. After retirement from service in 1975, he continued to serve in other areas such as the River Basin Authority and University Councils and the Board of the National Veterinary Research Institute, Vom.

PA (DR.) RAPHAEL AKINYELE OLAJIDE SHONEKAN (MON) AIMLS (Eng.), FIMLT (Nig), D. Tech. Hon. CAUSA (Minna)

Pa (Dr.) R. A. O. Shonekan (MON) was born in Kaduna on November 10, 1919 to Mr. S.A Shonekan a "Laboratory Storekeeper" the only Nigerian of note in service then at the Vom Veterinary Department. Pa Shonekan attended esteemed educational institutions such as Abeokuta Grammar School, (1932 - 34), King College, Lagos (1935 -40), Kingston-on-Thames Technical College (now College of Technology), Surrey, England (1950 -51) and Johns Hopkins University, (USA), 1966 -70. On 17th. May 1942, he was appointed third Class Laboratory Technical Assistant-In-Training here in Vom. In 1948, he became the first recipient of the Federal Government Scholarship to the Central

Veterinary Laboratory at the Ministry of Agriculture, Weybridge, Surrey -England, while there; he passed the Associate Institute of Medical Laboratory Technology Diploma Examination in Parasitology thus becoming the first Colonial/ African holder. From 1962 -66, and 1970, he was Chief Laboratory Technologist and Principal, Laboratory Technology Training School, at the then Federal 'Department of Veterinary Research, Vom. In 1965, he was appointed Member of the Order of the Niger (MON) in recognition of distinguished public service, the only such recipient in Vom for the next 25 years. From September 1973 to April 1974, he carried out duties and responsibilities of Acting Deputy Director of Veterinary Research and cited as Officer-In-Charge, FDVR, Vom in the absence of the Director, Dr. Musa Goni on several occasions. From 1974 to 1975, he served as the first Head, Division of Parasitology at the then Federal Department of Veterinary Research, FDVR, Vom and retired from the Civil Service in 1975. From 1979 -1988, Pa Shonekan was the Foundation Acting Head, Department of Medical Microbiology, University of Jos. During this same period, he was the first Honorary Consultant and Training Head, Department of Medical Microbiology and Parasitology, Jos University Teaching Hospital. From February 1976 to May 1979, he was the First Director of Sports, Plateau State Sports Council. He was President, Zoological Society of Jos, between 1964 -1984. Presently, Pa Shonekan is Chief Consultant, Christian Care for Widows/Widowers and the Aged (CCWA) and still going strong with hobbies like reading, herpetology, bird watching and music appreciation.

HIS ROYAL HIGHNESS, OBA (DR) KAMORU ADEKUNLE OLA-OLORUN SANSI, BVMS (Edin.), MRCVS, PhD, FCVSN

Dr. K. A. O. Sansi (VCN No. 171) was the first Nigerian to be trained at the famous Royal Dick Veterinary School, University of Edinburgh. Following his gradation in 1961, he returned to join the then Western Region of Nigeria as Veterinary Officer in the Ministry of Agriculture. He later joined the National Veterinary Research Institute, Vom, where he was a great motivator to research into livestock diseases. He became the Director of the Institute and President of the Veterinary Council of Nigeria (VCN) in 1977. As Director of NVRI, he encouraged research staff to enhance their capabilities by undertaking training programmer. In an era when oversees training was a matter of course, he would go out of his way to offer suggestions to staff on available training institution. His immense humour and steadfastness of purpose touched many. In 1979, he moved over to Kaduna, as Director to Nigeria Institute of Trypanosomiasis Research, Kaduna. He taught at the University of Ibadan and published many scientific papers. On retirement from service in 1985, he was enthroned a traditional ruler. The OBELU OF ESURE, in Ogun State.

Dr. ABUBAKAR GOFOLO LAMORDE, B.Sc., DVM, MPVM, Ph.D., FCVSN

Dr. Abubakar Gofolo Lamorde (VCN No. 124) became the first foreigner and first black man to be admitted to the College of Veterinary Medicine of the University of Missouri, where he bagged B.Sc. degree in 1968 and DVM in 1970. Dr. Lamorde attended Senior Primary School, Michika between 1956 and 1958, and was the only candidate selected from the area of study at the famous Barewa College, Zaria (then Government College, Zaria) at the end of his primary education. While a lecturer in Veterinary Microscopic anatomy at Ahmadu Bello University in 1971, he went back to the USA and enrolled for an M.Sc. Degree in Comparative Pathology at the University of California, Davis where he bagged PhD in 1974. Dr. A.G Lamorde became Director, NVRI, Vom, in 1979; a position he held until 2001 but for a two years period in which he was Director-General, Federal Ministry of

Agriculture, Abuja. He was President, Veterinary Council of Nigeria. (1979-1988). A very humble Nigerian, Dr. Lamorde associates freely with all and sundry including labourers and peasants farmers. Dr. Lamorde is presently Consultant to the Adamawa State University.

DR. (MRS) LAMI HANNATU LOMBIN, DVM, MSc, PhD, FCVSN

Dr. (Mrs) Lami Lombin (VCN No. 1342) trained as a Veterinarian at Nigeria's Premier University, U. I. graduating in 1976 with distinction in Pathology, thus becoming the first lady Veterinarian from the Northern part of Nigeria. Following her N. Y.S.C. year at Ahmadu Bello University, Zaria, she remained in that University as a Lecturer rising to the rank of Senior Lecturer by 1985. During her tenure at ABU, she successfully, completed an M.Sc. course at the University of Guelph, Canada. She returned to ABU in 1981 where she completed a PhD Programme (1988) working on comparative study of Ureaplasma in human and Bovine spp. Even as she worked on her PhD, her talent was recognized as she was appointed Plateau State Commissioner (1986 -89) and reappointed (1989 -90). In 1991 she moved on to NVRI, Vom as Assistant Director, a position which involved her in the management and coordination of research projects within the Institute and other collaborating agencies notably as simultaneous Project Officer of the National Agricultural Research Project (NARP).

In 1994, she received the Pfizer Animal Health Award for outstanding contribution to the Advancement of knowledge in Veterinary Medicine.

A two-term (1995 -98; 98- 2001) President of the NVMA, she was an elected member of the Veterinary Council of Nigeria, serving from 1997- 2001 when she was appointed as the current Director and Chief Executive National Veterinary Research Institute, Vom. Her administrative experience, especially through her ABU years and as Health Commissioner in Plateau State continue to aid her boost the image of the

Institute both in research output and aesthetics. Already as NVRI Director, her tenure has witnessed the employment of several veterinarians and other categories of staff. A consummate team player as borne out by over 60 collaborative research books/paper/conference papers, she exhibits the same essence in her administrative sagacity. She is a member of the International Organization of Mycoplasmaology. Dr. Lami Hannatu Lombin, married to Prof. L. G. Lombin and blessed with two children, takes to gardening, reading and sports for leisure.

NVRI 80th ANNIVERSARY AWARD CEREMONY

DISTINGUISHED LEADERSHIP AWARD

In recognition of their sterling leadership qualities and pioneering achievements as Director, National Veterinary Research Institute Vom

Dr Musa Goni (FCVSN) 1969- 1975

H. R. H. Oba (Dr) K. A. O. Sansi (FCVSN) 1975-1979

Dr A. G. Lamorde (FCVSN) 1979-1994, 1996-2001

Dr (Mrs.) Lami H. Lombin (FCVSN) 2001 to date

DISTINGUISHED LEADERSHIP AWARD

In recognition of his sterling leadership qualities and pioneering achievements as Principal, Laboratory Technology Training School National Veterinary Research Institute Vom

Pa (Dr) R. O. A. Shonekan (MON) 1956-1974

LEADERSHIP AWARD

In recognition of their Leadership qualities and achievements as Acting Director, National Veterinary Research Institute Vom

Dr. E. O. U. Ezebuio (FCVSN) 1966-1969

Dr. O. Onukwo (posthumous) 1994-1996

Dr K. A. Majiyagbe (FCVSN) 2001

DISTINGUISHED FARMER OF THE YEAR

In recognition of their contributions to the poultry industry and patronage to locally produced vaccines

Phinomar Nig Ltd Ngwo, Enugu State
Obasanjo Farms Ota, Ogun State

NVMA FARMER OF THE YEAR

In recognition of its promotion of the livestock industries through production of high quality livestock feeds, development of private Veterinary practices and Rural Development

ECWA Rural Development Ltd, Jos

MERITORIOUS SERVICE AWARD

In recognition of their meritorious services as Principal, College of Animal Health and Husbandry, National Veterinary Research Institute Vom

Dr B. Y. Owolodun (FCVSN) 1971-1977

Prof T. I. O. Osiyemi (FCVSN) 1977-1978

Prof Anthony E. J. Okoh (FCVSN) 1981-1982

Dr J. C. Ononiwu (FCVSN) 1991-1997

MERITORIOUS SERVICE AWARD

In recognition of their meritorious services as Principal Laboratory Technology Training School, National Veterinary Research Institute Vom

Mr. S. A. Jonah 1974-1978

Mr. E. J. Kogo (posthumous) 1978-1980

Mr. Sam O. Jemitola 1980-1990

Mr. Marcus Musa (posthumous) 1990-1996

SERVICE AWARD

In recognition of his service as Acting Provost, Federal College of Animal Health & Production Technology, National Veterinary Research Institute Vom

Dr M. S. Ahmed (FCVSN) 2001 to date

SERVICE AWARD

In recognition of your service as Acting Provost, Federal College of Veterinary and Medical Laboratory Technology, National Veterinary Research Institute, Vom

Dr Atanda Olabode 2003 to date

DISTINGUISHED ALUMNUS AWARD

In recognition of their achievements as a distinguished Alumnus of the Federal College of Animal Health & Production Technology, National Veterinary Research Institute, Vom

Dr. W. O. Ndep

Prof Mba Uzoukwu (FCVSN)

Prof J U. Akpokodje (FCVSN)

Prof G. O. Esuruoso (FCVSN)

Prof Shehu Alhaji Bida (FCVSN)

Prof Sam Asuquo Offiong

DISTINGUISHED ALUMNUS AWARD

In recognition of their achievements as a distinguished Alumnus of the Federal College of

Veterinary and Medical Laboratory,
National Veterinary Research Institute,
Vom

Prof D. E. Agbonlahor
Dr (Mrs.) Nneoma Idika
Chief (Dr) Jacob Abdulahi
His Royal Highness, Dr Mohammed
Zayyanu Abdullahi (CON)
His Majesty the King, Prof J. T. J.
Princewill

LONG SERVICE AWARD

In recognition of their long, dedicated and
outstanding contributions to the growth
and development of the Institute

Dr Ezekiel Eze
Dr J. C. Chima (FCVSN)
Dr I. Umo

Mr. Z. O Agbaji
Mr. Doman Batur
Dr M. I. Agba
Dr A. O. Ikwegbu
Mallam Yahaya Shuaibu
Mrs. A. N. Shidali
Mr. M. C. Ohaeri
Mr. M. M. Ajayi
Mr. P. C. Chukwuma
Mr. H. Okpala
Dr Gilbert Nwobu
Mr. T. T. Yilzem
Mallam M. A. Tula
Mr. Joseph Gyang
Mr. G. O. Ayabi
Mrs. Theresa Musa
Mr. Oladele Olabode
Mrs. Grace Akagbosu
Mr. Lar Nanchak
Mallam Tanko Tanimu
Mr. O. I. Uchendu
Mr. Barnabas Mali
Mr. T. G. Rwang
Mr. B. U. Njokuocha
Mr. C. T. A. Onwe
Dr M. O Asagba
Mr. Gyang Pam
Mr. J. N. Tiyyagnet
Mohammed A. Tula
Mr. J. O. Lonikola
Mr. G. O. Ogbonnah
Mr. Felix Chakven
Mr. Damina Kembo
Mrs. W. C. Ezeh

Mr. B. O. Mehalaiyese
Mr. B. E. Yinusa
Mr. Alhassan Garba
Mr. Yakubu Turu
Mr. John Pam
Mr. Aliyu Katanga
Mr. Yakubu Ribina
Mr. Pam Maisaje
Mr. Mathew Elachi
Mr. Francis Davou
Mr. A. T. Ikpa
Mr. Iliya Kwatjel
Mr. Maisaje Gyang

NVRI PRODUCTIVITY AWARD

In appreciation of their dedication and hard
work towards the development of the National
Veterinary Research Institute, Vom

Award Recipients	Department
Mr. Bitrus Chung	Workshop
Mr. Joseph Dido	Stores
Mr. James Orinya	Viral Vaccine
Production	
Mr. George Agbazi	Press
Mallam Wada Sale	Workshop
Mr. Tom Danjuma	Workshop
Mr. I. O. Okeke	Federal College of Veterinary & Medical Laboratory Technology

Mr. William Adedokun Workshop

Dr Tai Cole Federal College of Animal
Health & Production
Technology

Miss Agnes Onuoha Accounts