EVALUATION OF RINDERPEST VACCINATION PROGRAMME IN NORTHERN STATES OF NIGERIA

BY

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DECLARATION

The work presented in this thesis is original and was carried out by me under the Supervision of Profs. J. U. Umoh, O. O. Akerejola and J. O. Adekeye of Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria.

Reference is made to the work of other investigators and duely aknowledged. No part of this thesis has previously been submitted for a degree or diploma.

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CERTIFICATION

This thesis titled "Evaluation of Rinderpest Vaccination in Northern States of Nigeria" by Dr. J. A. Nwanta meets the regulations governing the award of the degree of Master of Science of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

To my wife

Mrs. Nkechi M. Nwanta

" A Tiger of a Woman."

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ABSTRACT

An investigation was undertaken with data collection on Rinderpest Vaccination returns and outbreaks from 1980 1989, field veterinary staff strength, qualifications and experience from the Federal Department of Livestock and Pest Control services, Kaduna and various Northern state veterinary headquarters respectively. Also 1000 copies of questionnaires desinged in relation to the various problems militating against rinderpest vaccination programme in eight Northern States of Nigeria were distributed to field veterinary staff and 807 completed copies returned.

The results of vaccination and outbreak figures showed that vaccination figures increased to about 11.4 million at the peak of outbreak (1983) and declined to about 2.3 million by 1988 when no outbreaks were reported. The available records on the immune status of our national herds showed that a lot of cattle were not protected.

On the various problems associated with rinderpest vaccination programme, the percentages of the respondents and the problems included:- inadequate means of transportation (20.7%), inadequate vaccination Inputs (14.8%), inadequate funding of the campaign (13.7%), lack of cooperation among cattle owners for fear of taxation or post vaccinal tissue reactions following simultaneous vaccination of cattle with tissue rinderpest, and contagious bovine pleuropneumonia vaccines (11.6%), improper restraining due to unavailability

of restraining materials (8.0%) and break in cold-chain due to limited storage facilities (7.8%).

Investigation into the various sources of vaccines and diluents showed about 19% of respondents said they procured both National Veterinary Reseach Institute (Vom) TCRV and foreign TCRV from our local markets. While all the repondents from Plateau State who commented on the availability of vaccines and diluents at the time of vaccination indicated that they were not usually available at the time of vaccination campaign, therefore this may have affected the antibody Level to rinderpest recorded in this State. More than 90% , of the respondents indicated that vaccines were transported from their source(s) to the State veterinary headquarters within 2 hours in Plateau State. Yet only 34.2% of their cattle had antibody to rinderpest. Also the percentage of cattle with antibody to rinderpest was low in Katsina and Plateau States where more than 15% of the respondents indicated that vaccines were carried in any available container without ice packs.

The proportion of seropositive animals in each State did not seem to depend on the involvement of veterinarians in the vaccination campaigns. Also there was no dear association between years of experience of the staff involved in the vaccination and the percentage of animals with antibodies to rinderpest. The composition of vaccination team differed significantly from State to State ($P<0.05$).

Recommendations on the ways of improving the campaign as responded included provision of adequate means of transportation (17.2%), adequate supply of vaccination inputs (15.2%), adequate publicity and enlightment campaign (11.9%) provision of incentives to field workers (10.7%) and also training of field staff (6.3%).

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CHAPTER I

INTRODUCTION

Rinderpest is one of the very serious economically important diseases of cattle in Nigeria. It has caused untold hardship to the Fulani herdsmen who have over 90% of the cattle population in this country. Major efforts were made by the different Nigerian governments to control the disease. A national control programme was instituted in 1924 following the panzootics of 1913 - 1914 and 1919 - 1920 (David-West, 1984, Anisulowo, 1987).

A joint project (JP) 15 to control the disease in Africa started in 1962 and ended in 1965 with a large proportion of cattle having been vaccinated against the disease. This resulted in a drastic reduction of the number of outbreaks. A relapse which occurred in 1970 was effectively controlled. No outbreaks were reported between 1976 and 1980. After the JP 15 programme, the vaccination tempo was relaxed in most African countries including Nigeria. Thus rinderpest - re-emerged from the residual enzootic foci and spread to many hitherto free African countries between 1979 and 1980 (Kariuki, 1989; Okonkwo, 1984; David-West, 1984; Lamorde, 1984; Majiyagbe, 1983).

The resurgence of rinderpest in Nigeria in the 1980s after a highly successful JP 15 campaign was traced to low antibody prevalence among our cattle (Okonkwo, 1984).

In 1966 about 96% of cattle were immuned (Rows, 1966) but the immunity level dropped to 76-80% ten years later (Taylor and Ojeh, 1981). Veterinary authorities in different states of Federation were unaware of the steady increase in the number of susceptible cattle until the devastating epidemics signalled that the gains of the JP 15 were totally lost. In 1983 alone, there were 1081 reported outbreaks (Anisulowo, 1987). However, the official data show that millions of doses of rinderpest vaccine were issued and presumably used. Recently another programme of action, Pan African Rinderpest Campaign (PARC) was launched in July, 1986 and massive vaccination followed (Anisulowo, 1988; 1989).

Official report showed no rinderpest outbreaks since 1987, but sero-monitoring results carried out throughout the federation indicated that a low herd immunity level of 25-60% and even as low as 10% occurred (Ezeokoli et al., 1990).

The reasons for the low immunity levels were still not clear. Could it be that the vaccines themselves were not potent, that delivery from the source to the animals was faulty or that vaccination inputs were insufficient? This study tries to examine the problems associated with the vaccination programme in the eight major cattle producing areas of Nigeria with a view of recommending ways to improve the existing control programme. The research objectives are

1. To examine and evaluate the available records on immune status of cattle population against rinderpest.
2. To investigate various problems associated with rinderpest vaccination programme.
3. To investigate various sources of vaccines and diluents in use, their types, adequacy and how cold-chain for their stability is being maintained.
4. To collect and evaluate data on different cadres of field veterinary staff, their qualifications and experience for proper vaccination.
5. Finally, to sample opinions with respect to ways of improving on the efficiency of the vaccination programme

CHAPTER 2

LITERATURE REVIEW

2.1 RINDERPEST OUTBREAKS IN THE WORLD

The earliest historical record of rinderpest outbreak was the 376-386 A.D. epizootics (Plowright, 1986). The disease was connected with the invading armies which in those days moved with their cattle. It was believed that the disease originated in China (Felton and Ellis, 1978). The outbreaks of 810 A.D. in France was reported to have been introduced by charylemagne's armies returning from wars (Wosu, 1989). At the turn of 18th Century, the Napoleonic and Franco - Prussian wars in Europe precipitated a lot of rinderpest outbreaks following mass movement of cattle as food reserves (Felton and Ellis, 1978; Wosu, 1989; Abdulkadir, 1989). These outbreaks involved France, Germany and Switzerland. Consequently, restrictions on movement of affected cattle and slaughter programme as control policy eliminated the disease by 1890.

In 1917, war again brought isolated outbreaks in Eastern Europe where the disease was reported to have persisted until 1921 (Felton and Ellis, 1978). The only known incidence of rinderpest in the Western Hemisphere was in 1920 as a result of Zebu cattle shipped from India to Brazil (Roberts, 1921). Similarly, peace time trade in cattle introduced the disease into Australia in 1923 but

this was immediadtely controlled by slaughter of 1300 affected cattle at a cost of £ 50,000.00 (Weston, 1924; Wosu, 1989).

The rinderpest outbreaks of 1865 in Britain was linked to cattle imported from Baltic States without adequate precautions. The disease spread to Holland from Britain through cattle importation and was immediately eradicated through strict control of cattle movement and marketing, and slaughter policy (Felton and Ellis, 1978). The last epidemic of the disease in Europe was reported in Rome Zoological gardens in 1949 (Cilli et al., 1951; Wosu, 1989). The outbreaks of the disease led to the establishment of the World's first Veterinary School in France in 1762 and later the International Office of Epizootics in Paris. Other Veterinary Schools sprang up following the epidemics of the disease in different parts of the world - Asia in 1872, Nigeria in 1914, Egypt in 1927 (Morcos, 1953; Ware, 1961, Hannaway, 1977; Felton and Ellis, 1978; David-West 1984; Wosu, 1989.)

2.2 RINDERPEST OUTBREAKS IN AFRICA

The first experience of rinderpest outbreaks in African Continent was in 1841 in Egypt through cattle importation from Romania (Felton and Ellis, 1978; Abdulkadir, 1989). The epidemic claimed about 75% of all cattle and buffaloes within the country and was spread Southwards along the Nile by the Italian army reaching Ethiopia and Sudan by 1884 and then to West Africa between 1885 - 1886. By the end of the century, the disease was reported again to have entered Africa from India through the horn of Africa, killing nearly 90% of cattle population South of Sahara hence the name "African plague" or "Black plague" (Lepissier, 1971; Nawathe and Lamorde, 1983; Ezeokoli and Umoh, 1984).

Nigeria had its own outbreaks through Chad in epidemic proportion from 1885 - 1886 (Felton and Ellis, 1978; Abdulkadir, 1989). About 270 outbreaks of rinderpest were recorded in Nigeria from 1962 - 1971 (Felton and Ellis, 1978), while the country was free of the disease from 1975 - 1980 following the efforts of the international control programme (JP, 15) (Felton and Ellis, 1978; David-West, 1984; Wosu, 1989; Plowright, 1986). Other African countries that were free of the disease within the late 1960s and 1970s were Senegal in 1968, Chad in 1971, Cote d'Ivore in 1973, Haute Volta in 1974, Niger and Kenya in 1975 (Plowright, 1986). After the JP 15 campaign in Africa (1962 - 1976),

the disease was confined to a few African countries due to immunization of large population of cattle in the twenty-two countries involved (Kariuki, 1989). By 1978 - 1979, rinderpest broke out from the residual enzootic foci in West Africa (Mali and Mauritania) and by 1980 onward the disease was confirmed in the adjacent States of Niger, Nigeria, Benin and Upper Volta, Mali, Ghana, Sudan, Chad, Cameroon and Central African Republic due to slack in the vaccination progamme after the JP. 15 (Kariuki, 1989, Plowright, 1986, Okonkwo, 1984, David-West, 1984).

Presently, the disease control situation in most African countries has taken an accelerated step. About twenty-eight countries of Africa have responded to the launching of Pan-African Rinderpest Campaign (PARC). The programme aims at vaccinating all the cattle in the continent and is being implemented through the OAU Inter-African Bureau for Animal Resources and funded by the European Economic Community and several other donors (Scott et al., 1986). The disease situation in some African countries showed that the last recorded outbreaks of the - disease in Chad was in 1984, while Niger was in 1984 and Nigeria was in 1987 (Anon, 1990, 1991.)

2.3 RINDERPEST IN NIGERIA

Rinderpest was recognised in Nigeria as far back as 1885 - 1886 when the disease reached Chad from Dafour and quickly entered Nigeria (Felton and Ellis, 1978). It spread to the North-Eastern part of Nigeria killing nearly 90% of the cattle population (Nawathe and Lamorde, 1983; Abdulkadir, 1989; Wosu, 1989). After this first outbreak in the country, the disease became endemic with occassional relatively mild outbreaks. The wide spread drought of 1912 - 1913 was seemed to have rendered the animals more susceptible and triggered off a bad outbreak of the disease in 1913 - 1914 (Ezeokoli and Umoh, 1984). Veterinary services were established by the British Colonial Government in the year 1914 mainly for the control of rinderpest (Nawathe and Lamorde, 1983; Okonkwo, 1984; Wosu, 1989). Another disastrous outbreak occurred in 1919 - 1920 due to drought which reduced the animals innate resistance and the first world war that diverted attention of veterinary authorities from the cattle disease problems (Wosu, 1989).

First control effort started with a voluntary vaccination scheme in 1924. In 1930 a network of vaccination centres and camps were established.

Cattle were gathered at these centres and camps for annual vaccination using anti-rinderpest serum and spleen homogenates from infected animals. In 1950, vaccination was made mandatory with the establishment of first veterinary investigation centre in the then Eastern Region of Nigeria at Ezzamgbo. The dry goat vaccine in use then caused violent reactions and high mortality in Muturu. By 1950 - 1960 lapinized vaccine was used and in 1960 the production of Tissue Culture Rinderpest Vaccidne (TCRV) in Vom was started. In 1962, a continental eradication campaign programme JP 15 was launched under the aegis of OAU/STRC for the eradication of rinderpest. Twenty-two countries were involved and about 80 million heads of cattle were vaccinated (Okonkwo, 1984; Kariuki, 1989). After the completion of the JP 15 campaign programme in 1966 in Nigeria, rinderpest outbreaks were reduced except for some minor resurgences in the years of political disturbances. Felton and Ellis, (1978) estimated a total loss of about 5,866 heads of cattle in Nigeria within the period 1967 - 1973.

Nigeria became free from rinderpest in the year 1975 (Nawathe and Lamorde, 1982; Okonkwo, 1984; Wosu, 1989). By 1980, the disease was reintroduced from Mali via the Niger Republic into Sokoto (Nawathe and Lamorde, 1982). This outbreak was attributed to cattle trade across the borders and delay in disease reporting (Okoye, 1983).

It spread to neighbouring states of Kaduna, Niger, Bauchi and Plateau States (Oluokun, 1984; Okonkwo, 1984; Wosu, 1989). The 1983 epizootic in Sudan spread to Egypt as well as Chad from where it spread to almost all the parts of Nigeria through Dikwa in Borno State (Nawathe and Lamorde, 1983; Wosu, 1989, Okonkwo, 1981). The strain of this virus appeared to be more virulent than the one that occurred in Sokoto. It involved Gongola, Benue, Kano, Kwara, Bauchi, Ogun, Kaduna, Oyo, Cross-River, Anambra, Niger, Rivers, Plateau, Ondo, Bendel and Sokoto States (Okonkwo, 1984). The outbreaks occurred during the migratory period of the herds to the South in search of dry season grazing grounds (September - June) causing high mortality. Wild life, including buffaloes, bush buck and warthog died of the disease in the Yankari Game Reserve and eland in closely fenced zoo at Maiduguri were also affected (Plowright, 1986). Following this, a great accelerated programme of cattle vaccination estimated to have covered approximately 11.4 million head was carried out in 1983 but the total number of animals killed by rinderpest in the years 1980 - 1985 inclusive has been estimated at 0.5 million with a further 1.9 million recovered cattle threatened by drought,

malnutrition and complicating disease, such as protozoal infections and contagious bovine pleuropneumonia (Plowright, 1986). The outbreaks have continued to decline and since 1988 there has not been any reported outbreak in the country (Anisulowo, 1989).

The constant threat to livestock industry by the rinderpest called for another thorough, well co-ordinated international eradication effort in the form of Pan-African Rinderpest Campaign. In February, 1982, a joint OIE/FAO/OAU meeting in Paris, OAU: IBAR was asked to prepare a plan for the eradication of rinderpest in Africa (David-West, 1984.) The proposals were continued in January, 1983, revised in May, 1983 and finally broadened at the request of the donor agencies primarily the European Economic Community (EEC), to include the costs of a joint attack on rinderpest and contagious bovine pleuropneumonia (CBPP) (Plowright, 1986). The PARC member countries were twenty-eight. The campaign successfully took off in Nigeria in October, 1987 with the vaccination of about 4.3 and 2.3 million heads of cattle between 1988 and 1989 respectively (Anisulowo, 1989).

In 1989, seromonitoring exercise was conducted throughout the federation and the results showed a low level of herd immunity of between 33.3 - 57.9% (Ezeokoli et al., 1990.)

CHAPTER 3

MATERIALS AND METHODS

One thousand (1,000) copies of questionnaires were distributed to different cadres of veterinary field staff in most of the local government areas of Borno State, Federal Capital Territory, Kaduna, Kano, Katsina, Niger, Plateau and Sokoto States. Apart from the filling of the questionnaires, veterinary officers and livestock farmers were interviewed and visits were made by the researcher to vaccination camps to observe the vaccination exercises. The interview was aimed at assessing the progress of the vaccination exercise and the response of livestock owners to the vaccination of their cattle against rinderpest. The researcher was always available to interprete the questionnaires where language barrier appeared to be the handicap to the understanding of the questionnaires.

Vaccination figures for 9 years (1980-89) in Nigeria and results of sero-monitoring exercise for Borno State, FCT, Kaduna, Kano, Katsina, Niger, Plateau and Sokoto States and data on the State veterinary staff strength and experience were collected from the Federal Department of Livestock and Pest Control Services, Kaduna and States veterinary headquarters respectively.

The data obtained was coded and analysed using Statistical Package for Social Sciences (SPSS) programme to determine the frequency of response to each variable for the States. The number recorded for each of the variables were then converted into percentages and tabulated against the States sampled. The seromonitoring data collected were related to the variables as they affect each of the areas sampled.

Lastly, the unanswered and wrongly answered questions were ignored in the analysis hence the variations in the total number of respondents in some tables.

CHAPTER 4

RESULTS

Out of 1,000 questionnaires distributed, 807 completed copies were returned. The result of vaccination coverage showed that vaccination figure increased at the time of greatest rinderpest outbreaks (1983) and started declining thereafter (table 1). By 1989 the figure had declined to 2,290,236 doses.

Cattle serum antibodies to rinderpest virus in the sampled states - ranged from 33-58% with the calves having the least titre and the adult cattle had the highest (table 2).

Table 3 shows the staff involved in the vaccination exercise showed that veterinarians were least in number (5.7%) with livestock assistants/inoculators being the highest (55.3%). Most of the staff had more than 10 years of experience in the vaccination exercise (41.7%) (table 4). However, Borno State and Federal Capital Territory (F.C.T.) had more of staff that had 2-5 years experience in vaccination.

About 68.1% of the respondents were employed by state government (table 5) but in Federal Capital Territory all the respondents were Federal government employees.

The source of vaccine indicated by respondents were National Veterinary Research Institute (NVRI) Vom (51.3%), Federal Department of Livestock and Pest Control Services Kaduna (29.7%), Market places for foreign and National Veterinary Research Institute (NVRI) Vom vaccines had 16.4 and 2.6% respectively. The Federal Capital Territory and Katsina State had 55.6% and 48.4% of the respondents that procured vaccine from Federal Department of Livestock and Pest Control Services, Kaduna. However, respondents from all States with exception of Borno, Federal Capital Territory, Katsina and Plateau indicated that they had at one time or another procurred Tissue culture rinderpest vaccine from open market (table 6).

On means of transport during collection of vaccine/diluents from the sources (table 7), 56.5% of the respondents indicated official means. However, respondents from Plateau State that used public means of transport constituted about 75.0% when compared to repondents that used official means of transport in almost all other areas sampled.

On the duration of time for a journey from vaccine source(s) to the State Veterinary Headquarters where the vaccines are stored, 46.5% of the respondents indicated that it took about 2-5 hours for such journey, while Borno and Sokoto States had the longest time lag (5-8 hours) (table 8).

A high percentage (90.1%) of the respondents indicated the use of coleman boxes with ice packs for keeping vaccine/diluents while on transit although few respondents in Kaduna, Kano, Katsina, Plateau and Sokoto States indicated that they used any available container without ice packs for keeping such vaccine/diluents on transit. Generally, the percentage of cattle with antibody to rinderpest was low in Katsina and Plateau States where more than 15% of the respondents indicated that vaccines were carried in any available container without ice packs (table 9).

With respect to the type of cooling system in use at the vaccine storage depot, the respondents indicated that ordinary electric refrigerators were mostly in use (57.1%) although a few respondents (26.8%) indicated the use of large deep capacity freezers , kerosine - refrigerators (13.6%) and cold store (2.5%) as in table 10.

The response with respect to sources of power supply in the sampled areas generally showed that National Electric Power Authority (N.E.P.A.) has the highest per centage (53.7%), followed by Rural Electrification Board (29.3%), and the least being kerosine refrigerator (4.3%). A part from Federal Capital Territory that has the highest per centage of respondents (50.0%) in favour of rural electrification boards, other states as Borno, Kaduna, Kano, Niger and Sokoto

had 28.1%, 26.1%, 35.3%, 33.3% and 34.8% respectively as respondents for the use of rural electrification board respectively. Some respondents (34.8%) said that electric generators were available as alternative source of power in the event of power failure at the vaccine storage depot in Kaduna State unlike in other states (table 11).

The regularity of power supply as in table 12) showed that many respondents (48.7%) indicated that power supply was irregular.

The response for the type of diluent in use for reconstituting vaccines in the area sampled showed a lot of variations among states. The overall percentage of the responses was more with the use of non-cold distilled water (39.6%), followed by the use of cold normal saline (22.9%), cold distilled water (21.2%), tap/well water (5.1%), and bottled/spring water (11.2%). None of the respondents indicated the use of tap/well water as diluent in Federal Capital Territory, Kaduna, and Plateau States. However, the use of bottled/spring water as diluent was recorded in all States sampled with exception of Federal Capital Territory as indicated by the percentages of the respective respondents in the areas. Also the result showed that more than 50% of the respondents said that non-conventional diluents (i.e. non-cold distilled water, Tap/well water, and bottled/spring water) were used in almost all the areas (table 13).

On the reconstitution of vaccine in the field, about 64.2% of the respondents said that vaccines were reconstituted after restraining the cattle, while 27.7% said that reconstitution occurred while cattle were being restrained and the rest (8.2%) said the vaccines were reconstituted before cattle were restrained. About 60.0% of repondents in Federal Capital Territory said they reconstituted vaccine while cattle are being restrained. Yet about 57.3% of their cattle are protected (table 14).

Generally, about 52.8% of the respondents said that livestock superintendents led vaccination teams at the time of vaccination, while 47.2% said that veterinarians were the team leaders. However, variations occurred from State to State with the chances of either cadres of officers as team leaders being 50.0% in Borno State. In Kaduna, Kano and Katsina States team leaders were mostly veterinarians. Generally the composition of vaccination teams differed significantlly from State to State ($P<0.05$)(table 15).

The response to number of vials of vaccines mixed in the field at a time generally showed that most of the respondents (54.7%) indicated that one vial of the vaccine was generally reconstituted in the field at a time (table 16). However, there were some respondents (0.6%) who indicated that upto 5 vials were usually reconstituted at a time. In Katsina State, some respondents (5.6%) said that

upto 5 vials , while in Kaduna (13.3%), Kano (2.1%), Sokoto (5.3%) said 2-5 vails of vaccine were sometimes reconstituted at a time in the field.

In table 17, many respondents (47.7%) indicated that vaccines/diluents were stored in containers without ice when vaccination was in progress. About 61.1% and 75.0% of respondents from Katsina and Plateau States indicated this and these States had only about 33-34% of the cattle having antibody to rinderpest.

Table 18 showed that about 49.8% of the respondents indicated that animal health assistants were responsible for reconstitution of vaccines.

Generally, in table 19, many respondents (52.7%) indicated that vaccines and diluents were in short supply. About 68.2% and 80.0% of the respondents indicated this and these States had only about 38-34% of the cattle having antibody to rinderpest.

On the availibility of vaccines and diluents at the time of vaccination, most of the respondents (65.5%) said that they were not available. All the respondents from Plateau who commented on the item indicated that vaccines/diluents were not usually available at the time of vaccination campaign (table 20).

The responses to question of regularity of vaccination showed that majority of the respondents (93.1%) said that vaccination was done once in a year (table 21).

About 43.0% of the respondents said that cattle owners/Fulani usually requested for vaccination while 11.3% said they were only interested when outbreaks were reported. None of the respondents in Niger, FCT and Plateau areas said that cattle owners were ready to pay for the services unlike in other areas sampled. In Federal Capital Territory, Kano, Katsina, Niger and Plateau States most of the respondents (42.9, 44.0, 57.9, 65.0 and 41.8% respectively) said that cattle owners requested for vaccination at the report of outbreaks. In almost all the areas sampled with exception of Sokoto State, 6.3%, 14.3%, 5.9%, 8.0%, 5.3%, 5.0% and 8.3% of the respondents said that cattle owners were indifferent to vaccination exercise in Borno, FCT, Kaduna, Kano, Katsina, Niger and Plateau States respectively. In the Federal Capital Territory, Kano and Plateau States about 11.3%, 2.0% and 8.3% of the respondents said that settled Fulanis requested for the services regularly and nomadic ones request for it only at the report of outbreaks (table 22).

Vaccination procedure in the sampled areas as responded showed on the overall that 89.9% of the respondents indicated that Tissue culture rinderpest vaccine (TRCV) and contagious bovine pleuropneumonia (CBPP) vaccines were being used concurrently, while 9.5% of the respondents said TCRV was in use at a time and 0.6% said that no pattern was in use. A small percentage of respondents from Borno (13.8%), FCT (28.6%), Kaduna (6.7%), Kano (4.2%), Katsina (5.6%), Niger (21.7%) and Plateau (9.1%) States said that TCRV vaccination was done at a time only, while a negligible percentage (3.4%) in Borno State responded that there was no pattern (table 23).

On whether there were individuals that vaccinated cattle against rinderpest other than government employed vaccination personnel, about 82.1% of the respondents responded in affimative (table 24).

About 65.7% of the respondents said that private veterinarians/government veterinary staff and 34.3% said quacks/untrained personnels were involved in vaccination without issuing certificates (table 25).

With respect to commonly encountered problems in the field following cases of uncertified vaccination, about 97.2% of the respondents said that inadequate vaccination coverage were encountered and 2.8% said cases of cattle being vaccinated with materials other than tissue culture rinderpest vaccine were encountered (table 26).

Assessment of reasons responsible for incomplete vaccination coverage in the sampled areas yielded variable responses, with about 27.1% of the respondents saying that it was due to inadequate or lack of means of transport to the field, 21.9% saying that cattle owners were unwilling to present all their cattle for vaccination for fear of either taxation or tissue reaction following vaccination. About 20.5% of the respondents blamed inadequate supply of vaccine and diluents as the cause and 13.8% blamed it on inadequate publicity being given to the vaccination exercise. In Borno and Kaduna States, 28.1% and 24.4% of the respondents respectively said that inadequate vaccine and diluents supply hampered the vaccination coverage, while 29.8% of the respondents from Sokoto State said it was due to unwillingness of cattle owners to present all their cattle for vaccination for fear of either cattle tax or post vaccine reactions. Every area sampled with excepton of Borno and Kaduna States had most of the respondents saying that

inadequate means of transport was the major cause of incomplete vaccination coverage (table 27).

Most of the respondents (79.0%) said that alternative arrangement were usually made for dry season feeding of cattle (table 28).

Diseases encountered in the field as reported by the respondents were shown in table 29.

The list of other problems commonly encountered in he field is shown in table 30.

The responses to the question on the reasons behind Fulani or nomads refusing their cattle being vaccinated, about 28.6% of the respondents said it is due to post vaccinal reactions while 25.8% attributed it to lack of understanding on why healthy cattle should be vaccinated. Also 19.2% of the respondents said that fear of cattle taxation make some cattle owners refuse presenting their animals for vaccination. However, 7.0% of the respondents attributed it to wrong timing of vaccination period. About 4.5% of the respondents said that some cattle owners have lost confidence in some local government veterinary staff following their dubious activities, but this was not considered as a problem in Sokoto State. About 4.9% of the respondents said restraint difficulties and lack of medical aid to restrainers contributed to cattle owners refusing vaccination, but none of the respondents in Federal Capital Territory considered them as problems. Lack of visible improvement on the health status of sick cattle vaccinated and lack of synchronized schedule of vaccination period between the cattle owners, the local chiefs (Ardos) and veterinary staff had 4.2% of the respondents respectively.

About 1.7% of the respondents mentioned the psychological belief of cattle owners that free services were not genuine and reliable, therefore they prefered paying for the vaccination (table 31).

The opinions of the respondents in various areas sampled were sought with respect to ways of improving the efficiency of the existing vaccination programme in the country. The responses are showed in table 32. About 17.2% of the respondents recommended provision of adequate means of transport while 15.2% recommended adequate supply of vaccination inputs such as vaccines, diluents, automatic syringes, needles, coleman boxes, ice packs and refrigerators. In addition, 11.9% recommended adequate publicity and enlightment campaign to be carried out before the vaccination season and 10.7% recommended provision of adequate incentives to field veterinary staff in form of allowances and life assurance benefits; 9.8% recommended that private veterinarians operating within a state should register with the state director of veterinary services so that identifying quacks would be easier and also that states and local government authorities should equally assist adequately in funding the vaccination campaign. About 9.3% suggested annual launching of the vaccination campaign from Federal to State and local government levels, and that para-veterinary staff should be re-deployed to liaise

constantly with the local chiefs (Ardos) and cattle owners with respect to vaccination schedules. About 6.3% of the respondents recommended adequate training of veterinary field staff at state and local government levels on the handling and delivery of vaccines to the animals. This they said should be done through workshops and seminars.

About 5.0% of the respondents suggested that experienced and qualified veterinarian should always supervise any vaccination exercise and that such a veterinarian should be the team leader. About 4.5% of the respondents recommended that annually regulated vaccination programme should be done without waiting for outbreaks to occur and this should be closely followed by sero-monitoring exercise. Also 3.9% suggested proper identification mark for the vaccinated animals and prosecution of herdsmen who refuse their cattle being vaccinated, while 3.9% suggested provision of restraint materials for restraining the cattle during vaccination programme. About 3.7% said that cold delivery vans for carrying vaccines should be made available to each state veterinary headquarters and 1.7% recommended that people involved in veterinary quackery and illegal vaccine trafficking should be prosecuted while 3.2% recommended that veterinarians should be employed at every state and local government veterinary centres. In addition 1.9% suggested that incentives should be given to the herdsmen where necessary to encourage their participation in vaccination programmes while 1.6% suggested that vaccination season

should be arranged to fall within period of pasture availability. About 2.8% of the respondents suggested that good co-ordination of various efforts through harmonization of take off time for vaccination throughout the nation and involvement of local chiefs (Ardos) in enforcing the vaccination exercise down to their subjects. A few of the respondents (1.0%) recommended that imported vaccines should not be released for use until their immunological efficacy were determined and that improved veterinary services should be encouraged throughout the nation while 1.2% recommended that grazing reserves should be provided for herdsmen where they should take their cattle for grazing and these areas should serve as vaccination camps.

Other recommendation were that vaccination should be carried along the cattle migration routes within each state and should be accompanied with certified vaccination cards (1.3%); that proper checks be conducted in our control posts, international borders and quarantine stations to identify cattle with no history of vaccination against rinderpest. (1.3%); that veterinary activities be incorporated in the curriculum of the recently launched nomadic education (1.4%); regular supply of light and improved electrification especially where vaccines are stored(0.9%); that cattle owners should be encouraged to form village cooperative

societies aimed at caring for the health of their animals by laising with the nearest veterinary clinic (0.8%); that cattle tax should be abolished and that National Veterinary Research Institute Vom should stop selling vaccines to non-veterinarians (0.8%). In addition, about 0.8% recommended that maximum cooperation among government employed veterinary staff and private veterinary practioners should be encouraged. About 0.5% recommended that Federal Government through Department of Livestock and Pest Control Services should take over completely the control of Rinderpest Vaccination Campaign Programme where state and Local government authorities are reluctant.

CHAPTER 5

DISCUSSION

The increased vaccination return at the time of greatest rinderpest outbreaks and decline recorded thereafter is an indication that cattle owners either respond poorly to vaccination campaign at the end of outbreaks or that government authorities make available less quantity of vaccination inputs and funds as outbreaks decline.

The low level of post vaccinal serum antibodies to rinderpest virus in the States under study, show that large proportion of cattle in these areas were unprotected at the time the serum samples were obtained. Thus should the rinderpest be reintroduced into the country devastating outbreaks should be expected, unless such cattle are having antibodies against Peste des Petit Ruminants (PPR) too.

It seems that in almost all the areas sampled, low number of veterinarians were recorded. Therefore, the insufficient number of veterinarians who could have supervised the reconstitution and administration of the vaccine in the field to avoid abuses affected the effeiency of the vaccine delivery from the source to the animals. Although, it seems on the surface that the vaccination experience of the field staff did not have influence on the proportion of cattle having antibody against rinderpest, but it is likely that with the low number of veterinarians in the field, that the experienced livestock auxillaries may have been adopting the wrong vaccination procedure for years.

Even though about 19% of the repondents said that they procured vaccine from local drug houses (open market) in the market which may have been handled improperly as to affect their potency, it is not sufficient reason for one to draw conclusion from this becauce there is no information as regards to the proportion of people of the same category that were not interviewed.

About 34.6% of the respondents said that they used public transport during collection of vaccine from the source to their repective state depots. Therefore, except where they have reliable cold-chain facilities, such vaccine may be subjected to cold-chain break due to delays in the course of the journey. But unfortunately Plateau State which is nearer to the source of the vaccine than any other sampled areas had one of the lowest proportion of cattle having antibody against rinderpest. This may likely be due to other factors as inadequate or unavailabilty of vaccine at the time of vaccination and frequent power failures at the vaccine storage depots in the state. All these may have affected the delivery and potency of the vaccine. Plowright et al, (1970); (1971); Wosu,(1989), confirmed that the immunological potency of the rinderpest vaccine is affected when exposed to increased temperature or light intensity. Although, most of the respondents said electric dependent cooling systems were in use for vaccine storage at the depot, yet the reliability and regularity of power supply in these areas still pose a lot of problems as regards to cold-chain maintenance.

However, about 34.8% of the respondents said electric generator was attached as alternative source of power in the event of power failure in Kaduna State, but unfortunately this had little effect on the proportion of individual cattle immuned. Therefore, other factors still play important role in determining the level of immunological response to vaccination. One should also bear in mind that most of the villages in these areas either depend on rural electrification boards (REB) which normally supply electric power from 6 p.m. to 6 a.m.

Many of the respondents (39.6%) said that non-cold distilled water were made use of in reconstituting vaccine in the field. This probably created a high temperature gradient between the hot diluent and the cold vaccine hence affecting the stability of the virus in the vaccine (Plowright et al., 1970; 1971; Wosu, 1989). Similarly, the use of non-conventional diluents like Tap/well and bottled/spring water were reported in almost all the areas sampled. These diluents are harmful to the viral particles in the vaccine due to either the pH or chlorine content (Onyima, 1985). The recommended diluent is either cold magnesium sulphate or normal saline, or phosphate buffered saline that protects the virus from isotonic shock and may be thermoprotective for rinderpest virus vaccine especially when concurrent vaccination against rinderpest and - contagious bovine pleuropneumonia are done (Onyima, 1985).

The fact that a good percentage of respondents reconstituted the vaccine during restraining of cattle, is an indication that a lot of time is normally wasted before reconstituted vaccine is administered to the animals. Normally the diluent used determines the shelf life of the reconstituted vaccine viz - cold distilled water maintains the shelf-life for 1/2 - 1 hour, while cold normal saline takes 1 - 2 hours and cold molar magnesium sulphate 2 - 4 hours (Onyima, 1985, Wosu, 1989). Therefore, cattle should normally be restrained first before vaccine is reconstituted. It is normally advisable to reconstitute one vial of vaccine at a time and the rest kept in a coleman box with ice blocks/packs.

Livestock superintendents led vaccination teams due to limited number of veterinarians in the field. Therefore, in such a situation, vaccination efficiency may be poor except where such cadre of staff are experienced in the vaccination exercise. Also veterinarians, where available, should be allowed to reconstitute vaccines in the field otherwise experienced livestock superintendents may do so.

Majority of the respondents indicated that animal health assistants reconstitute vaccines. Therefore, cases of abuses may have been recorded except where such cadre of staff is experienced and properly guided in the vaccination to avoid abuses..

Apart from vaccination efficiency, another important factor is vaccination coverage. This is determined by either

the quantity of vaccines and diluents supplied (vaccination inputs) or by response of the cattle owners to the exercise. The inadequacy and unavailability of these vaccination inputs and improper handling of vaccines and administration contributed to the low percentage of the animals having antibody against rinderpest.

The fact that most vaccinations are done yearly implies that animals which escape vaccination for one year may have to wait until the following year if possible. Since the chances of vaccinating all the animals within the locality at that material time are rare, cases of some cattle remaining unvaccinated for many years may be high especially in areas with large cattle population.

Vaccination procedure commonly adopted in all the States is simultaneous vaccination against rinderpest and contagious bovine pleuropneumonia (CBPP). Therefore, due to post vaccinal tissue reactions commonly encountered in CBPP vaccination, most of the cattle owners refuse their cattle being vaccinated (Anisulowo, 1987; 1988; 1989). Also many cases of uncertified vaccinations were recorded in the areas sampled. Such dubious activities create a lot of problems in the field. There is a likelihood of the use of materials other than tissue culture rinderpest vaccines for the vaccination of cattle (Okoduwa, 1984). In addition this creates problem of knowing cattle that have been properly vaccinated.

Among the recorded problems militating against adequate vaccination coverage are means of transport to the field, cattle owners not responding to the vaccination for fear of post- vaccinal tissue reactions and inadequate vaccination inputs. Therefore, antibody prevalence must remain low unless the issues are tackled.

On supplementary feeding during dry season, it is an important factor to be considered in dry season vaccination. Apart from poor immunological response due to the poor physiological state of the vaccinated cattle (Plowright et al,., 1970; 1971), cattle owners do not allow their cattle to be vaccinated during this period of pasture scarcity because of stress. The non-existence of outbreaks probably contributed in making cattle owners to respond poorly to the vaccination campaigns.

The numerous problems militating against vaccination programmes in the states sampled may have partly contributed to inadequate vaccination coverage and poor vaccine administration to the cattle.

Various organs of government should attach greater importance to the recommendations for improving the control programme in this country.

CONCLUSION

From the available records on antibody level response and the responses from the questionnaires administered to the field veterinary staff it should be noted that the immunity rates are rather low and that it is important to address the points raised in this research if we aim at controlling the disease in the near future.

Therefore, the researcher strongly make the following recommendations:

1. That solar energy cooling system should be attached near the vaccine storage depots to solve the problem of irregular electricity supply.

2. That thermostable rinderpest vaccine should be the alternative vaccine for use in the country.

3. That centrally commissioned laboratory charged with the responsibility of producing and distributing diluents is necessary. Such laboratory will incorporate bovine serum while preparing the diluents to help it extend shelf-life of reconstitited vaccine.

4. That adequate training of manpower for the vaccination programme should be considered as being important.

5. That government should provide adequate fund and vaccination inputs for the smooth running of the programme.

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LIST OF TABLES.

TABLE 1

RINDERPEST OUTBREAKS AND VACCINATION RETURNS RECORD IN NIGERIA; 1980-1989.

YEAR	OUTBREAKS	VACCINATION RETURNS
1980	20	2,919,000
1981	10	1,088,124
1982	30	569,917
1983	1,081	11,350,812
1984	329	8,106,048
1985	39	7,803,633
1986	2	5,897,783
1987	1	7,821,898
1988	0	4,260,267
1989	0	2,290,236

SOURCE: NATIONAL RINDERPEST/CBPP CO-ORDINATION UNIT; FEDERAL DEPARTMENT OF LIVESTICK AND PEST CONTROL SERVICES, KADUNA.

TABLE 2.0

DISTRIBUTION OF SERUM ANTIBODIES TO RINDERPEST VIRUS IN CATTLE FOLLOWING CAMPAIGN IN NORTHERN NIGERIA AS SCREENED BY ELISA 1990 - 1991

STATE/ LOCATION	TOTAL NO OF SERA TESTED	TOTAL NO OF SERA POSITIVE	DISTRIBUTION OF SERUM ANTI BODIES AMONG DIFFERENT AGE GROUPS. < 1 YR	1 - 2 YRS	>2 YRS
1. BORNO	1751	685(38.5%)	115/389(29.5%)	275/797/34.9%)	256/475(53.9%)
2. F.C.T	915	521(57.3%)	45/98(45.9%)	150/293(51.2%)	210/366(57.4%)
3. KADUNA	1175	493(42.0%)	-	-	-
4. KANO	968	560(57.9%)	89/176(50.6%)	194/328(59.2%)	277/464(59.7%)
5. KATSINA	968	322(33.3%)	-	-	-
6. NIGER	964	411(42.6%)	-	-	-
7. PLATEAU	1480	506(34.2%)	68/345(19.7%)	159/545(29.2%)	279/585(47.7%)
8. SOKOTO	1144	548(47.9%)	-	-	-

SOURCE: NATIONAL RIDERPEST/CBPP CO-ORDINATION OFFICE, FEDERAL DEPARTMENT OF LIVESTOCK AND PEST CONTROL SERVICE KADUNA. [1990]

TABLE 3

DISTRIBUTION OF STAFF INVOLVED IN VACCINATION CAMPAIGN AGAINST RINDERPEST

STATES	1	2	3	TOTAL	% OF ANIMALS WITH ANTI-BODY
BORNO	8 (3.52)	116 (51.10)	103 (45.37)	227	685/1781 (38.46)
F.C.T.	1 (0.96)	22 (21.15)	81 (77.88)	104	524/915 (57.27)
KADUNA	13 (24.07)	18 (33.33)	23 (42.59)	54	493/1175 (41.97)
KANO	9 (7.44)	54 (44.63)	58 (47.93)	121	560/968 (57.85)
KATSINA	6 (7.59)	20 (25.32)	53 (67.09)	79	322/968 (33.26)
NIGER	4 (3.51)	63 (55.26)	47 (41.23)	114	411/964 (42.63)
PLATEAU	6 (6.00)	26 (19.00)	68 (68.00)	100	506/1480 (34.19)
SOKOTO	4 (4.49)	27 (30.34)	58 (65.17)	89	548/1141 (47.90)
TOTAL	51 (5.74)	346 (30.96)	491 (55.29)	888	

KEY:

1. VETERINARIAN (DVM).
2. LIVESTOCK SUPERINTENDENT/TECHNOLOGIST; (OND, HND, B S.C)
3. LIVESTOCK ASSISTANT/INOCULATOR (ADULT EDUCATION, WASC, FSLC, NIL).

TABLE: 4

VACCINATION EXPERIENCE OF STAFF INVOLVED IN
VACCINATION AGAINST RINDERPEST

STATES	YEARS OF EXPERIENCE <2	2-5	6-10	10	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	3 (1 .32)	119 (51.42)	46 (20.26)	59 (25.99)	227	38.46
F.C.T.	9 (8 .65)	78 (75.00)	16 (15.38)	1 (0 .96)	104	57.27
KADUNA	0 -	6 (11.11)	20 (37.04)	28 (51.85)	54	41.97
KANO	9 (7 .44)	24 (19.83)	37 (30.58)	51 (42.15)	121	57.95
KATSINA	3 (3 .80)	13 (16.46)	11 (13.92	(65.82)	79	33.32
NIGER	1 (0 .88)	2 (1 .75)	32 (28.07)	79 (69.30)	114	42.63
PLATEAU	0 -	23 (23.00)	14 (14.00)	63 (63.00)	100	34.19
SOKOTO	0 -	1 (1 .12)	51 (57.30)	37 (41.57)	89	47.90
TOTAL	25 (2 .82)	266 (29.95)	227 (25.56)	370 (41.67)	888	

TABLE 5:

PRINCIPAL EMPLOYER

STATES	FED. GOVT.	STATES	LOCAL	PRIVATE	TOTAL	% OF ANIMALS WITH ANTI-BODY
BORNO	20 (15.38)	100 (76.92)	10 (7.69)	0 -	130	685/1781 (38.46)
F.C.T.	25 (100.00)	0 -	0 -	0 -	25	524/915 (57.27)
KADUNA	5 (6.67)	60 (80.00)	60 (80.00)	0 -	75	493/1175 (41.97)
KANO	0 -	150 (63.83)	80 (34.01)	5 (2.13)	235	560/968 (57.85)
KATSINA	15 (16.67)	55 (61.11)	20 (22.22)	0 -	90	322/968 (33.26)
NIGER	10 (11.11)	75 (83.33)	5 (5.56)	0 -	90	111/964 (42.63)
PLATEAU	0 -	55 (19.67)	5 (8.33)	0 -	60	506/1480 (34.19)
SOKOTO	10 (10.53)	50 (52.63	35 (36.81)	0 -	95	518/1144 (47.90)
TOTAL	85 (10.62)	545 (68.13)	165 (20.63)	5 (0.62)	800	

TABLE 6:

SOURCE OF TISSUE CULTURE RINDERPEST VACCINES (TCRV) AND DILUENTS IN USE IN THE SAMPLED STATES.

STATES	1	2	3	4	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	78 (68.42)	27 (23.61)	9 (7.89)	0 -	111	(38.46)
F.C.T.	12 (11.11)	15 (55.56)	0 -	0 -	27	(57.27)
KADUNA	12 (58.33)	21 (29.17)	6 (8.33)	3 (4.17)	72	(11.97)
KANO	123 (46.07)	66 (24.72)	72 (26.97)	6 (2.25)	267	(57.85)
KATSINA	36 (38.71)	45 (48.39)	12 (12.90)	0 -	93	(33.26)
NIGER	42 (60.87)	21 (30.43)	3 (1.35)	3 (1.35)	69	(42.63)
PLATEAU	30 (58.82)	9 (17.65)	12 (23.53)	0 -	51	(34.19)
SOKOTO	51 (44.74)	36 (31.58)	18 (15.79)	9 (7.89)	111	(47.90)
TOTAL	111 (51.30)	240 (29.74)	132 (16.36)	21 (2.60)	807	

KEY 1. NATIONAL VETERINARY RESEARCH INSTITUTE(NVRI) VOM.
2. FEDERAL DEPARTMENT OF LIVESTOCK AND PEST CONTROL SERVICE KADUNA
3. LOCAL GOVERNMENT
4. MARKET PLACE FOR FOREIGN TCRV.
5. MARKET PLACE FOR NVRI TCRV.

TABLE 7

MEANS OF TRANSPORT FOR COLLECTION OF VACCINES AND DILUENTS FROM THE SOURCE(S)

	MEANS OF TRANSPOTATION			
STATES	PUBLIC	OFFICIAL	PRIVATE	TOTAL
BORNO	44 (36.67)	76 (63.33)	0 -	120
F.C.T.	0 -	16 (66.67)	8 (33.33)	21
KADUNA	20 (20.00)	14 (41.00)	36 (36.00)	100
KANO	84 (42.86)	108 (55.10)	4 (2.04)	196
KATSINA	28 (31.82)	52 (59.09)	8 (9 .09)	88
NIGER	12 (16.67)	52 (72.22)	8 (11.11)	72
PLATEAU	36 (75.00)	12 (25.00)	0 -	18
SOKOTO	28 (35.00)	52 (65.00	0 -	80
TOTAL	252 (34.62	412 (56.59)	64 (8.79)	728

TABLE: 8

DURATION OF TIME ELAPSE DURING TRANSPORTATION OF VACCINE FROM SOURCE(S) TO THE STATE VETERINARY HEADQUARTERS.

STATES	1	1-2	2-5	5-8	>8	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	15 (11.54)	20 (15.38)	70 (53.35)	25 (19.23)	0 -	130	38.16
F.C.T.	0 -	15 (60.00)	10 (40.00)	0 -	0 -	25	57.37
KADUNA	5 (6.67)	35 (46.67)	30 (40.00)	5 (6.67)	0 -	75	41.37
KANO	5 (2.13)	35 (14.89)	155 (65.96)	35 (14.89)	5 (2.13)	235	33.26
NIGER	15 (16.67)	20 (22.22)	25 (27.78)	30 (33.33)	0 -	90	42.62
PLATEAU	35 (63.64)	15 (27.27)	5 (9.09)	0 -	0 -	55	31.19
SOKOTO	0 -	0 -	30 (35.29)	50 (58.82)	5 (5.88)	85	47.90
TOTAL	90 (11.46)	175 (23.29)	365 (46.50)	145 (18.47)	10 (1.27)	785	

TABLE: 9

THE TYPE OF COOLING SYSTEM IN USE WHILE TRANSPORTING VACCINES AND DILUENTS.

STATES	1	2	3	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	0 -	108 (100.00)	0 -	108	34.16
F.C.T.	0 -	20 (100.00)	0 -	20	57.37
KADUNA	0 -	56 (83.33)	4 16.67)	60	41.97
KANO	4 (1.85)	184 (85.29)	28 (12.96)	216	57.35
KATSINA	0 -	56 (73.68)	20 (26.32)	76	23.26
NIGER	0 -	72 (100.00)	0 -	72	12.63
PLATEAU	0 -	44 (84.62)	8 (15.38)	52	24.19
SOKOTO	0 -	76 (95.00)	4 (5.00)	80	17.90
TOTAL	4 (0.58)	616 (90.06)	64 (9.36)	684	

K^2 = WITH D.F. = 14

KEY: 1. LONG-ACTING REFRIGERANT
2. COLEMAN BOX WITH ICE BLOCKS/PACES
3. ANY AVAILABLE CONTAINER WITHOUT ICE PACES

TABLE: 10

TYPE OF COOLING SYSTEM IN USE AT THE VACCINE STORAGE DEPOT

STATE	1	2	3	4	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	32 (26.67)	68 (56.67)	12 (10.00)	8 (6.67)	120	38.46
F.C.T.	8 (20.00)	20 (50.00)	8 (20.00)	4 (10.00)	40	57.27
KADUNA	20 (23.81)	48 (57.14)	16 (19.05)	0 -	84	41.97
KANO	52 (20.97)	144 (58.06)	44 (17.74)	8 (3.23)	248	57.85
KATSINA	24 (27.27)	60 (68.18)	4 (4.55)	0 -	88	33.26
NIGER	28 (38.89)	44 (61.11)	0 -	0 -	72	42.63
PLATEAU	4 (8.33)	32 (66.67)	12 (25.00)	0 -	48	34.19
SOKOTO	44 (47.83)	36 (39.13)	12 (13.04)	0 -	92	47.90
TOTAL	212 (26.77)	452 (57.07)	108 (13.64)	20 (2.53)	792	

KEY: 1. LARGE CAPACITY DEEP FREEZER(S).
2. ORDINARY ELECTRIC REFRIGERATOR(S).
3. KEROSINE REFRIGERATOR(S).
4. COLD STORE.

TABLE: 11

SOURCE(S) OF POWER SUPPLY IN THE STATES SAMPLED

STATES	1	2	3	4	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	76 (59.38)	36 (28.13)	12 (9.34)	4 (3.13)	128	38.46
F.C.T.	8 (20.00)	20 (50.00)	4 (10.00)	8 (20.00)	40	57.27
KADUNA	28 (30.43)	24 (26.09)	32 (34.78)	8 (8.70)	92	41.97
KANO	116 (56.86)	72 (35.29)	16 (7.84)	0 -	204	57.85
KATSINA	64 (84.21)	8 (10.53)	4 (5.26)	0 -	76	33.26
NIGER	44 (61.11)	24 (33.33)	4 (5.56)	0 -	72	42.63
PLATEAU	32 (66.67)	4 (8.33)	4 (8.33)	8 (16.67)	48	34.19
SOKOTO	36 (39.16)	32 (34.78)	20 (21.74)	4 (1.35)	92	47.90
TOTAL	404 (53.72)	220 (29.26)	96 (12.77)	32 (4.26)	752	

KEY: 1. NATIONAL ELECTRIC POWER AUTHORITY (NEPA).
2. RURAL ELECTRIFICATION BOARD (REB).
3. GENERATOR ATTACHED.
4. KEROSINE REFRIGERATOR.

TABLE: 12

REGULARITY OF POWER SUPPLY IN THE AREAS SAMPLED

STATES	1	2	3	4	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	65 (48.15)	70 (51.85)	0 -	0 -	135	38.46
F.C.T.	5 (20.00)	5 (20.00)	15 (60.00)	0 -	25	57.27
KADUNA	35 (46.67)	40 (53.33)	0 -	0 -	75	41.97
KANO	60 (25.00)	150 (62.50)	30 (12.50)	0 -	240	57.85
KATSINA	45 (52.94)	40 (47.06)	0 -	0 -	85	33.26
NIGER	45 (52.94)	30 (33.29)	10 (11.76)	0 -	85	42.63
PLATEAU	15 (30.00)	30 (60.00)	5 (10.00)	0 -	50	34.19
SOKOTO	50 (52.63)	20 (21.05)	20 (21.05)	5 (5.26)	95	47.90
TOTAL	320 (40.51)	385 (48.73)	80 (10.13)	5 (0.63)	790	

X^2 = 41.00 WITH D.F. = 21
SIGNIFICANT P<0.05

1. VERY REGULAR.
2. IRREGULAR.
3. ALWAYS ON BY 6:00 PM AND OFF BY 6:00 AM.
4. NOT YET CONNECTED.

TABLE: 12

TYPES OF DILUENT USED ON AREAS SAMPLED

STATE CODE	1	2	3	4	5	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	12 (13.04)	24 (30.96)	14 (15.22)	8 (8.70)	24 (26.09)	94	34.46
F.C.T.	8 (40.00)	6 (30.00)	6 (30.00)	0 -	0 -	20	57.27
KADUNA	13 (20.00)	26 (40.32)	20 (33.33)	0 -	2 (3.33)	65	41.97
KANO	44 (27.50)	72 (45.00)	24 (15.00)	2 (1.25)	18 (11.25)	160	57.35
KATSINA	10 (13.89)	28 (38.89)	24 (33.33)	6 (8.33)	4 (5.56)	72	33.26
NIGER	16 (25.81)	22 (35.48)	12 (19.36)	6 (9.68)	6 (9.68)	62	42.43
PLATEAU	8 (19.05)	18 (42.86)	8 (19.05)	0 -	8 (19.05)	42	34.19
SOKOTO	14 (17.35)	26 (32.32)	26 (33.33)	8 (10.26)	4 (5.13)	78	47.90
TOTAL	134 (26.16)	332 (39.59)	134 (22.87)	30 (5.12)	66 (11.26)	586	

KEY: 1. COLD DISTILLED WATER
2. DISTILLED WATER (NOT COLD)
3. COLD NORMAL SALINE
4. TAP/WELL WATER
5. BOTTLED WATER (BOTTLED/SPRING WATER).

TABLE: 14

TIME OF VACCINE RECONSTRUCTION PRIOR TO ADMINISTRATION.

STATES	1	2	3	ALL	% OF ANIMALS WITH ANTIBODY
BORNO	5 (3.85)	25 (19.23)	100 (76.92)	130	34.46
F.T.C.	0 -	15 (60.00)	10 (40.00)	25	57.27
KADUNA	0 -	20 (28.57)	50 (71.43)	70	41.97
KANO	35 (14.89)	100 (42.55)	100 (42.55)	235	57.85
KATSINA	0 -	15 (16.67)	75 (83.33)	90	33.26
NIGER	10 (11.11)	20 (22.22)	60 (66.67)	90	42.63
PLATEAU	5 (8.33)	20 (33.33)	35 (58.33)	60	34.19
TOTAL	65 (8.84)	205 (27.87)	510 (64.15)	735	

KEY: 1. BEFORE RESTRAINING THE CATTLE
2. WHILE THE CATTLE ARE BEING RESTRAINED
3. AFTER RESTRAINING THE CATTLE.

TABLE: 15

THE COMPOSITION OF VACCINATION TEAM.

STATES	TEAMS 1	2	ALL	% OF ANIMALS WITH ANTIBODY
BORNO	50 (50.00)	50 (50.00)	100	38.46
F.C.T.	5 (20.00)	20 (80.00)	25	57.37
KADUNA	50 (71.43)	20 (28.57)	70	41.97
KANO	120 (58.54)	85 (41.46)	205	57.85
KATSINA	55 (61.11)	35 (38.89)	90	33.26
NIGER	15 (80.00)	65 (81.25)	80	42.63
PLATEAU	20 (36.36)	35 (63.64)	55	34.19
SOKOTO	20 (23.33)	65 (76.47)	85	47.90
TOTAL	335 (47.18)	375 (52.82)	710	

X^2 = 17.89 WITH D.F. = 7
SIGNIFICANT $p<0.05$

KEY: 1. a. VETERINARIAN (TEAM LEADER)
b. LIVESTOCK SUPERINTENDENT/TECHNOLOGIST
c. LIVESTOCK ASSISTANTS/INOCULATORS

2. a. LIVESTOCK SUPERINTENDENT/TECH.
(TEAM LEADER)
b. LIVESTOCK ASSISTANTS/INOCULATORS.

TABLE: 10

NUMBER OF VIALS OF VACCINE (TCRV) MIXED AT A TIME IN THE FIELD.

STATES	1	1-2	2-3	3-4	TOTAL	WITH ANTIBODY
BORNO	64	20	0	20	104	
	(61.54)	(19.23)	-	(19.23)		38.46
F.C.T.	12	8	0	0	20	
	(60.00)	(40.00)	-	-		57.27
KADUNA	44	8	8	0	60	
	(73.33)	(13.33)	(13.33)	-		41.37
KANO	26	104	4	8	142	57.85
	(18.31)	(73.23)	(2.82)	(5.63)		
KATSINA	56	0	8	8	72	33.26
	(77.78)	-	(11.11)	(11.11)		
NIGER	44	16	0	8	68	42.63
	(64.71)	(23.53)	-	(11.76)		
PLATEAU	16	24	0	8	48	34.19
	(33.33)	(50.00)	-	(16.67)		
SOKOTO	40	24	4	8	76	37.90
	(52.63)	(31.58)	(5.26)	(10.53)		
TOTAL	302	204	24	60	590	
	(51.19%)	(34.58%)	(4.05%)	(15.46%)		

X^2 = 60.87, D.F. = 49; NS.

TABLE 17

STORAGE OF VACCINES/DILUENTS WHILE VACCINATION IS IN PROGRESS

STATES	CONTAINER WITH ICE	CONTAINER WITHOUT ICE	TOATL	% OF ANIMALS WITH ANTIBODY
BORNO	85 (62.96)	50 (37.01)	135	31.16
F.C.T.	20 (80.00)	5 (20.00)	25	27.27
KADUNA	30 (60.61)	20 (36.36)	50	41.97
KANO	105 (53.85)	90 (46.15)	195	57.85
KATSINA	30 (38.89)	45 (61.11)	90	33.26
NIGER	15 (50.00)	45 (50.00)	90	42.63
PLATEAU	15 (25.00)	45 (75.00)	60	34.19
SOKOTO	50 (52.63)	45 (47.37	95	47.90
TOTAL	390 (52.35)	355 (47.65)	745	

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TABLE 13

STAFF THAT RECONSTITUTED VACCINES IN THE FIELD

STATES	VET.	ANIMAL HEALTH ASSIST.	AUXILLARY /INOCULATOR	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	36 (31.58)	63 (55.26)	15 (13.16)	111	(38.46)
F.C.T.	3 (11.11)	15 (55.56)	9 (33.33)	27	(57.27)
KADUNA	33 (42.31)	30 (38.46)	15 (19.23)	78	(41.97)
KANO	32 (18.18)	123 (53.25)	56 (28.57)	231	(57.85)
KATSINA	33 (28.95)	45 (39.47)	36 (31.58)	114	(33.26)
NIGER	12 (16.67)	52 (72.22)	8 (11.11)	72	(42.63)
PLATEAU	6 (11.76)	30 (58.62)	15 (29.11)	51	(34.19)
SOKOTO	9 (8 .82)	51 (50.00)	42 (41.18)	102	(47.90)
TOTAL	183 (23.02	396 (19.81)	216 (27.17)	795	

TABLE 19:

ADEQUACY OF VACCINES

STATES	ADEQUATE	INADEQUATE	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	35 (13.64)	75 (68.18)	110	(38.46)
F.C.T.	15 (60.00)	10 (40.00)	25	(57.27)
KADUNA	20 (30.77)	45 (69.23)	65	(11.97)
KANO	120 (51.06)	115 (48.94)	235	(57.85)
KATSINA	45 (50.00)	45 (50.00)	90	(33.26)
NIGER	60 (75.00)	20 (25.00)	80	(42.63)
PLATEAU	10 (20.00)	40 (80.00)	50	(34.19)
SOKOTO	45 (52.94)	40 (47.06)	85	(47.90)
TOTAL	350 (47.30)	390 (52.70)	740	

TABLE 20

AVAILABILITY OF VACCINES AND DILUENTS AT THE TIME OF VACCINATION

STATES	AVAILABLE	NOT AVAILABLE	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	45 (36.00)	80 (64.00)	125	(38.46)
F.C.T.	15 (60.00)	10 (40.00)	25	(57.27)
KADUNA	15 (25.00)	45 (75.00)	60	(41.97)
KANO	60 (28.57)	150 (71.43)	210	(57.85)
KATSINA	25 (31.25)	55 (68.75)	80	(33.26)
NIGER	50 (55.56)	40 (11.11)	90	(42.63)
PLATEAU	0 -	40 (100.00)	40	(34.19)
SOKOTO	35 (43.75)	45 (56.25)	80	(47.90)
TOTAL	245 (34.51)	465 (65.49)	710	

TABLE 21:

REGULARITY OF VACCINATION

STATES	ONCE A YEAR	EVERY TWO YEAR	NOT DONE FOR OVER TWO YEARS	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	125 (92.59)	5 (3 .70)	5 (3.70)	135	(38.16)
F.C.T.	25 (100.00)	0 -	0 -	75	(57.27)
KADUNA	70 (93.33)	5 (6 .67)	0 -	75	(11.97)
KANO	225 (93.75)	15 (6 .25)	0 -	240	(57.85)
KATSINA	80 (88.89)	0 -	10 (11.11)	90	(33.26)
NIGER	80 (88.89)	5 (5 .56)	5 (5.56)	90	(42.63)
PLATEAU	50 (10.00)	0 -	0 -	50	(34.19)
SOKOTO	85 (94.44)	5 (5 .56)	0 -	90	(47.90)
TOTAL	740 (93.08)	35 (4 .10)	20 (2.52)	795	

TABLE 22:

RESPONSE OF CATTLE OWNERS/FULANIS TO VACCINATION

STATES	1	2	3	4	5	TOTAL
BORNO	68 (53.13)	16 (12.D50	8 (6 .25)	36 (28.13)	0 -	128
F.C.T.	0 (28.57)	0 -	4 (14.29)	12 (42.86)	4 (14.29)	28
KADUNA	32 (47.06)	20 (29.41)	4 (5 .88)	12 (17.65)	0 -	68
KANO	80 (40.00)	12 (6 .67)	16 (8 .00)	88 (44.00)	1 (2 .00)	200
KATSINA	24 (31.58)	4 (5 .26)	4 (5.26)	44 (57.89)	0 -	76
NIGER	24 (30.00)	0 -	4 (5 .00)	52 (65.00)	0 -	80
PLATEAU	20 (41.67)	0 -	4 (8.33)	20 (41.67)	4 (8.33)	48
SOKOTO	52 (59.09)	4 (4 .55)	0 -	32 (36.36)	0 -	88
TOTAL	308 (43.02)	56 (7 .82)	44 (6 .15)	296 (41.34)	12 (1.68)	716

KEY
1. THEY REQUEST FOR THE VACCINATION
2. THEY ARE READY TO PAY FOR THE SERVICES
3. THEY ARE INDIFFERENT OVER THE VACCINATION EXERCISE
4. THEY ARE INTERESTED ON REPORT OF OUTBREAK
5. SETTLED FULANI VACCINATE REGULARLY, WHILE NOMADIC ONES REQUEST FOR IT WHEN OUTBREAK OCCURS.

TABLE 23

VACCINATION PROCEDURE IN THE SAMPLED AREAS.

STATES	TCRV USED AT A TIME	TCRV & CBPPV CONCURRENTLY	NO PATTERN USED	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	16 (13.79)	96 (82.76)	4 (3.44)	116	(38.46)
F.C.T.	8 (28.57)	20 (71.43)	0 -	28	(57.27)
KADUNA	4 (6 .67)	56 (93.33)	0 -	60	(41.97)
KANO	8 (4 .17)	184 (95.83)	0 -	192	(57.85)
KATSINA	4 (5 .56)	68 (94.44)	0 -	72	(33.26)
NIGER	20 (21.74)	72 (78.26)	0 -	92	(42.63)
PLATEAU	4 (9.09)	40 (90.91)	0 -	44	(31.19)
TOTAL	64 (9.47)	608 (89.94)	4 (0 .59)	676	

TABLE 24:

ARE THERE INDIVIDUALS WHO VACCINATE CATTLE IN THE SAMPLED AREAS OTHER THAN GOVERNMENT EMPLOYED/SPONSORED VACCINATION TEAM ?

STATES	YES	NO	UNKNOWN	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	68 (62.96)	24 (22.22)	16 (14.81)	108	(38.46)
F.C.T.	20 (100.00)	0 -	0 -	20	(57.27)
KADUNA	56 (93.33)	4 (6 .67)	0 -	60	(41.97)
KANO	140 (72.92)	36 (16.67)	20 (10.42)	192	(57.85)
KATSINA	64 (88.89)	0 -	8 (11.11)	72	(33.26)
NIGER	64 (88.89)	4 (5 .56)	4 (5.56)	72	(42.63)
PLATEAU	48 (100.00)	0 -	0 -	48	(34.19)
SOKOTO	72 (94.74)	0 -	4 (5.56)	76	(47.90)
TOTAL	532 (82.10)	64 (9.88)	52 (8.02)	648	

TABLE 25

PERSONNELS SUSPECTED IN THE UNCERTIFIED VACCINATION

STATES	PRIVATE /GOVT VET. STAFF	QUACKS UNTRAINED PERSONNELS	TOTAL	% OF ANIMALS WITH ANTIBODY
BORNO	12 (19.05)	51 (80.95)	63	38.46
F.C.T.	9 (33.33)	18 (66.67)	27	57.27
KADUNA	36 (46.15)	42 (66.67)	78	41.97
KANO	90 (48.39)	96 (51.61)	186	57.85
KATSINA	15 (20.83)	57 (79.17)	72	33.26
NIGER	18 (15.79)	48 (84.21)	57	42.63
PLATEAU	30 (45.45)	36 (54.55)	66	34.19
SOKOTO	12 (16.67)	60 (83.33	72	47.90
TOTAL	213 (34.30	408 (65.70)	621	

TABLE 26

POSSIBLE ENCOUNTERED PROBLEMS FOLLOWING CASES OF UNCERTIFIED VACCINATION.

STATES	1	2	TOTAL
BORNO	78 (89.66)	9 (10.34)	87
F.C.T.	27 (100.00)	0 -	27
KADUNA	63 (100.00)	0 -	63
KANO	156 (96.30)	6 (51.61)	162
KATSINA	96 (100.00)	0 -	96
NIGER	63 (95.45)	3 (4 .55)	66
PLATEAU	54 (100.00)	0 -	54
SOKOTO	93 (100.00)	0 -	93
TOTAL	360 (97.22)	18 (2 .78)	648

KEY:

1. INADEQUATE VACCINATION COVERAGE.
2. VACCINATION OF CATTLE WITH MATERIALS OTHER THAN TCRV.

TABLE 27

REASONS BEHIND INCOMPLETE VACCINATION COVERAGE IN THE SAMPLED LOCALITY

STATE CODE	1	2	3	4	5	TOTAL
BORNO	23 (28.05)	18 (21.95)	10 (12.20)	10 (12.20)	21 (25.61)	82
F.C.T.	2 (9.27)	4 (19.05)	5 (23.81)	5 (23.81)	5 (23.81)	21
KADUNA	10 (24.39)	8 (19.51)	6 (14.63)	7 (17.07)	10 (21.39)	41
KANO	23 (15.65)	32 (21.77)	26 (17.69)	24 (16.33)	12 (28.57)	147
KATSINA	13 (26.00)	9 (18.00)	7 (14.00)	7 (14.00)	14 (28.00)	50
NIGER	8 (17.02)	12 (25.53)	9 (19.15)	5 (10.64)	13 (27.66)	47
PLATEAU	10 (25.64)	6 (15.38)	8 (20.51)	4 (10.26)	11 (28.21	39
SOKOTO	10 (17.54)	17 (29.82)	10 (17.54)	5 (8.77)	15 (26.32)	57
TOTAL	99 (20.45)	106 (21.90)	81 (16.71)	67 (13.81)	131 (27.81)	484 (27.07)

KEY 1. INDEQUATE VACCINES AND DILUENTS.
2. CATTLE OWNERS UNWILLING TO PRESENT ALL THEIR CATTLE FOR VACCINATION FOR FEAR OF TAXATION
3. NEW ANIMALS ARE CONSTANTLY INTRODUCED INTO THE HERD AFTER VACCINATION
4. LITTLE OR NO PUBLICITY GIVEN TO THE VACCINATION
5. INADEQUATE OR LACK OF MEANS OF TRANSPORT.

TABLE 28

IS AN ALTERNATIVE ARRANGEMENT MADE FOR FEEDING CATTLE DURING DRY SEASON IN THE SAMPLED LOCALITY ?

STATES	YES	NO
BORNO	70 (53.85)	60 (46.15)
F.C.T.	27 (100.00)	0 -
KADUNA	55 (73.33)	20 (26.67)
KANO	205 (85.42)	35 (14.58)
KATSINA	90 (100.00)	0 -
NIGER	65 (76.47)	20 (23.53)
PLATEAU	35 (58.33)	25 (14.67)
SOKOTO	80 (94.12)	5 (5.88)
TOTAL	620 (78.98)	165 (21.02)

TABLE 29

Q34. DISEASES OF CATTLE ENCOUNTERED IN THE FIELD.

	% OF RESPONDENTS		% OF RESPONDENTS
1. ANTHRAX	---- 2.1	12. HELMINTHIASIS	--4.0
2. BLACK QUARTER	---- 10.7	13. HAEMORRHAGIC SEPTICAEMIA	--0.7
3. BOVINE TUBERCULOSIS	---- 1.4	14. BOVINE OPHTHALMIA	--0.1
4. BRUCELLOSIS	---- 2.1	15. NUTRITIONAL DEFICIENCY	--0.2
5. CALF SCOURS	---- 0.1	16. PARAMPHISTOMIASIS	--19.3
6. COCCIDIOSIS	---- 0.2	17. SALMONELLOSIS	-- 0.7
7. COLLIBACILLOSIS	---- 0.1	18. STREPTOTHRICOSIS	-- 7.5
8. CONTAGIOUS BOVINE PLEUROPNEUMONIA	---- 20.0	19. TICK INFESTATION	-- 1.0
9. FASCIOLIASIS	---- 1.0	20. TRYPANOSOMIASIS	-- 9.6
10. FOOT AND MOUTH DISEASE	-- 11.60	21. RINDERPEST	-- 0.7
11. HEART WATER	--- 6.00		

TABLE 30

Q35. OTHER COMMONLY ENCOUNTERED PROBLEMS IN THE FIELD WHILE ON RINDERPEST VACCINATION

	PROBLEMS	REPONDENTS REPORTING IT.
1.	BREAK IN COLD-CHAIN DUE TO LIMITED STORAGE FACILITIES	----- 7.8
2.	INADEQUATE/LACK OF MEANS OF TRANSPORT	-----20.7
3.	INACCESSIBILITY TO FULANI CAMPS DUE TO BAD ROADS	----- 3.1
4.	INADEQUATE/LACK OF VACCINATION INPUTS	-----14.8
5.	LACK OF COOPERATION AMONG CATTLE OWNERS FOR FEAR OF TAXATION AND TISSUE REACTION	-----11.6
6.	POWER TUSSLE AMONG THE VILLAGE HEADS	----- 0.5
7.	LACK OF OR INADEQUATE TRAINED MANPOWER TO SUPERVISE AND VACCINATE THE ANIMALS	----- 3.1
8.	INADEQUATE FUNDING OF THE CAMPAIGN BY STATES AND LOCAL GOVERNMENT. HENCE WORKERS ALLOWANCES AND BENEFFITS ARE NOT SETTLED	----13.7
9.	POOR COMMUNICATION BETWEEN THE VETERINARY STAFF AND CATTLE OWNERS AND INADEQUATE PLANNING	---- 1.0
10.	ILLEGAL VACCINATION BY QUACKS WHO VACCINATE WITHOUT ISSUEING CERTIFICATES	---- 4.9
11.	DIRECT PROCUREMENT OF VACCINES AND SELF-ADMINISTRATION BY THE MYALI - ALLAH GROUP. THEREFORE, SUCH CATTLE OWNERS WILL ALWAYS SAY THAT THEIR CATTLE HAVE BEEN VACCINATED.	---- 1.0
12.	POOR INFORMATION CIRCULATION OR PUBLICITY AS REGARDS TO WHEN AND WHERE THE VACINNATION IS TO TAKE PLACE	---- 4.7
13.	INEFFECTIVE CATTLE MOVEMENT CONTROL AS NEW ANIMALS ARE CONSTANTLY BEING INTRODUCED WITHOUT VACCINATION CERTIFICATE	---- 2.6
14.	ABSENCE OF ANY REPORTED OUTBREAKS OF THE DISEASE MAKES CATTLE OWNERS RELUCTANT OVER VACCINATION EXERCISE	---- 1.6
15.	IMPROPER RESTRAINT AND UNAVAILABILITY OF RESTRAINING MATERIALS IN SOME AREAS	---- 8.0
16.	DEMAND FOR DRUGS ESPECIALLY TRYPANOCIDAL DRUGS BY CATTLE OWNERS.	---- 0.9

TABLE 31

Q36. REASONS BEHIND FULANIS/NOMADS REFUSING THEIR CATTLE BEING VACCINATED.

	REASONS	RESPONDENTS REPORTING
1.	POSTVACCINAL REACTIONS/TRAUMATIC EXPERIENCES FROM PREVIOUS VACCINATION	---164 (28.57%)
2.	NO VISIBLE IMPROVEMENT ON THE HEALTH OF SICK ANIMALS VACCINATED	--- 24 (4.18%)
3.	LACK OF UNDERSTANDING ON WHY HEALTHY ANIMALS SHOULD BE VACCINATED	---148 (25.78%)
4.	LACK OF SYNCHRONIZED SCHEDULE OF VACCINATION BETWEEN THE FULANI CATTLE OWNERS, ARDOS AND VETERINARY STAFF	--- 24 (4.18%)
5.	WRONG TIMING OF VACCINATION PERIOD - I.E. DRY SEASON	--- 40 (6.97%)
6.	CATTLE TAX (JANGALI)/FEAR OF EXTORTION OF MONEY BY VETERINARY STAFF	---110 (19.16%)
7.	LACK OF CONFIDENCE IN SOME LOCAL GOVT. VET. STAFF	--- 26 (4.54%)
8.	RESTRAINING DIFFICULTIES/LACK OF MEDICAL AID TO RESTRAINERS	--- 23 (4.88%)
9.	THE PHYCHOLOGICAL BELIEF THAT FREE SERVICES ARE UNRELIABLE - HENCE THEY PAY QUACKS FOR THE VACCINATION	--- 10 (1.74%)
		574

TABLE 32

Q 37
WAYS OF IMPROVING RINDERPEST VACCINATION EFFECIENCY AS INDICATED BY PERCENTAGE(%) OF RESPONDENTS

	WAYS OF IMPROVING VACCINATION	RESPONDENTS REPORTING
1.	ADEQUATE PROVISION OF INCENTIVES TO FIELD VETERINARY STAFF IN FORM OF ALLOWANCE AND INSURANCE BENEFITS.	--- 10.7
2.	PEOPLE INVOLVED IN VETERINARY QUACKERY AND TRAFFICKING SHOULD BE PROSECUTED.	--- 1.7
3.	IMPORTED VACCINES SHOULD NOT BE USED UNTIL THEIR IMMUNOLOGICAL EFFECIENCY IS DETERMINED.	--- 1.0
4.	CATTLE OWNERS SHOULD BE ENCOURAGED TO FORM VILLAGE COOPERATIVE SOCIETIES AIMED AT CARING FOR THE HEALTH OF THEIR ANIMALS.	--- 0.9
5.	*ADEQUATE TRAINING OF THE VETERINARY FIELD STAFF AT STATE* AND LOCAL GOVERNMENT LEVELS ON THE HANDLING AND DELIVERY OF VACCINES TO THE ANIMALS.	--- 6.3
6.	ADEQUATE SUPERVISION OF VACCINATION EXERCISE BY QUALIFIED AND EXPERIENCED VETERINARIANS (VETERINARIANS TO BE TEAM LEADERS).	--- 5.0
7.	VETERINARIANS MUST BE EMPLOYED BY BOTH LOCAL AND STATE VETERINARY SERVICES.	--- 3.2
8.	PRIVATE VETERINARIANS WITHIN A STATE MUST BE REGISTERED WITH THE DIRECTOR OF VETERINARY SERVICES OF THAT STATE. THIS WILL HELP TO TRAP DOWN THE QUACKS.	--- 1.2
9.	ADEQUATE FUNDING OF THE COMPAIGN BY STATE AND LOCAL GOVERNMENTS.	--- 9.8
10.	ADEQUATE PUBLICITY AND ENLIGHTMENT CAMPAIGN SHOULD BE CARRIED OUT BEFORE THE VACCINATION SEASON.	--- 11.9
11.	ANNUAL LAUNCHING OF THE CAMPAIGN FROM FEDERAL TO STATE AND LOCAL GOVERNMENT LEVELS. THE RE-DEPLOYMENT OF PARA-VETERINARY STAFF TO BE IN DIRECT CONTACT WITH CATTLE OWNERS.	--- 9.3
12.	ABOLITION OF CATTLE TAX (JANGALI) AT ALL LEVEL.	--- 0.9
13.	NVRI SHOULD AVOID SELLING VACCINES TO INDIVIDUALS WHO ARE NOT VETERINARIANS.	--- 0.9

14. ADEQUATE MEANS OF TRANSPORT TO BE PROVIDED. ---17.2

15. VACCINATION INPUTS AS VACCINES, DILUENTS, AUTOMATIC SYRINGES, NEEDLES, COLEMAN BOXES, ICE PACKS, FIRST AID MATERIALS ETC. SHOULD BE PROVIDED. ---15.2

16. IMPROVED VETERINARY SERVICES THROUGHOUT THE NATION WITH REGARDS TO PROPHYLAXIS AGAINST HOMEPARASITES, THEIR VECTORS AND OTHER INTERCURRENT INFECTIONS THAT LOWER IMMUNE RESPONSE OF ANIMALS. --- 1.0

17. GREATER CO-ORDINATION OF VARIOUS EFFORTS THROUGH HARMONIZATION OF TAKE OFF TIME FOR VACCINATION THROUGHOUT THE NATION AND INVOLVEMENT OF LOCAL CHIEFS IN ENFORCING THE EXERCISE. --- 2.8

18. PROPER IDENTIFICATION MARK FOR THE VACCINATED ANIMALS AND PROSECUTION OF HERDSMEN WHO REFUSED THEIR CATTLE BEING VACCINATED. --- 3.9

19. PROVISION OF INCENTIVES WHERE NECESSARY TO THE HERDSMEN TO ENCOURAGE THEM. --- 1.9

20. COOPERATION AMONG THE GOVERNMENT EMPLOYED VETERINARY STAFF AND PRIVATE VETERINARY PRACTIONERS SHOULD BE ENCOURAGED TO MAKE HARMONIZATION OF AREAS COVERED IN THE VACCINATION EXERCISE EASIER. --- 0.8

21. VETERINARY ACTIVITIES TO BE INCORPORATED IN THE CURRICULUM OF THE RECENTLY LAUNCHED NOMADIC EDUCATION. --- 1.4

22. ANNUALLY REGULATED VACCINATION PROGRAMME SHOULD BE DONE WITHOUT WAITING FOR OUT-BREAK TO OCCUR AND IT SHOULD BE CLOSELY FOLLOWED BY SERO-MONITORING EXERCISE. --- 4.5

23. FEDERAL GOVERNMENT THROUGH FEDERAL-DEPARTMENT OF LIVESTOCK AND PEST CONTROL SERVICES SHOULD TAKE OVER THE TOTAL CONTROL OF RINDERPEST VACCINATION CAMPAIGN PROGRAMME. --- 0.5

24. GRAZING RESERVES SHOULD BE PROVIDED FOR HERDSMEN WHERE THEY SHOULD TAKE THEIR ANIMALS FOR GRAZING AND THESE AREAS SHOULD SERVE AS VACCINATION POINTS. --- 1.2

25. VACCINATION SHOULD BE CARRIED ALONG THE CATTLE MIGRATION ROUTES WITHIN EACH STATE AND SHOULD BE ACCOMPAIMED WITH ISSUANCE OF VACCINATION CERTIFICATE. --- 1.3

26. REGULAR SUPPLY OF LIGHT/IMPROVED ELECTRIFICATION ESPECIALLY WHERE VACCINES ARE STORED. --- 0.9

27. PROPER CHECK TO BE CONDUCTED IN OUR CONTROL POSTS, INTERNATIONAL BORDERS AND QUARANTINE STATIONS TO IDENTIFY ANIMALS WITH NO HISTORY OF VACCINATION. --- 1.2

28.	PROVISION OF RESTRAINT MATERIALS.	--- 3.9
29.	PROVISION OF COLD DELIVERY VANS FOR CARRYING VACCINES.	--- 3.7
30.	VACCINATION TO BE DONE DURING PERIOD OF PASTURE AVAILABILITY - JUST BEFORE THE RAINING SEASON.	--- 1.6

QUESTIONNAIRE FOR FIELD VETERINARY WORKERS

Please answer the questions below. Where options are supplied indicate the appropriate answer(s) by putting a tick ( ) in the correct box (es)

1 Your Name (not compulsory) _____

2 Your Address _____

3 Post or training of person answering questionnaire :

(i) ¦___¦ Zonal Veterinary Officer (ZVO)

(ii) ¦___¦ Veterinary Officer

(iii) ¦___¦ Livestock Officer (Animal Scientist) Livestock supt.

(iv) ¦___¦ Auxillary/inoculator/Livestock overseer

(v) ¦___¦ Other (Specify) _____

4 Principal employer or Organisation providing care:

(i) Federal Government

(ii) State Government

(iii) Local Authority/Government

(iv) Private Practice

(v) Other (Specify) _____

5 Are you previously or currently involved in the vaccination of cattle against rinderpest in your area

(i) ( ) Yes (ii) ( ) No

(iii) Other (Specify) _____

6 The source(s) of TCRV vaccine/diluents supply or procurement in your

locality is/are

i) ( ) NVRI (Vom)

ii) ( ) Federal livestock Dept., Kaduna

iii) ( ) Open market for foreign TCRV

iv) ( ) Open market for local TCRV _____

7 Indicate the means mostly in use in your locality to transport these vaccines/diluents from the source(s) to the state veterinary office storage depot/field

i) ( ) Public transport ii) ( ) official vehicle iii) ( ) Private

8 How long does it take for such journey from vaccine/diluent source(s) to the destination?

i) ( ) 1 hour

ii) ( ) 1 - 2 hours

iii) ( ) 2 - 5 hours

iv) ( ) 5 - 8 hours

v) ( ) 8 hours

9 The type of cooling system in use where the vaccine/diluents are being transported is/are _____

i) ( ) Long - acting stable refrigerant

ii) ( ) Coleman boxes with ice packs

iii) ( ) Any container available

10 When the storage depot/destination is reached the cooling system in use is/are

i) ( ) Large capacity deep freezer(s)

ii) ( ) Ordinary electric refrigerator(s)

iii) ( ) Kerosine refrigerator(s)

iv) ( ) Cold store

11 Indicate the source(s) of power supply in your locality:

i) ( ) NEPA

ii) ( ) Rural Electrification Board (REB)

iii) ( ) Generator attached to house where the vaccine/diluents are stored

iv ( ) Kerosine Refrigerator

12 How regular is the power supply

i) ( ) Very regular

ii) ( ) Irregular

iii) ( ) Always put on from 6.00 pm to 6.00 am

iv) ( ) Not yet Connected.

13 In the field what type of diluent(s) do you use for reconstituting your vaccine

i) ( ) Cold Distilled water

ii) ( ) ordinary distilled water

iii) ( ) Cold normal saline

iv) ( ) Tap/Well water

v) ( ) Bottled water (Spring water)

14 When do you reconstitute the vaccine(s) in the field ?

i) ( ) Before restraining the cattle

ii) ( ) While the cattle are being restrained

iii) ( ) After restraining the cattle

15 For each vaccination visit, name the composition of the teams(s) in your locality

TEAM MEMBERS		RANK
1 a.	Veterinarian	Team Leader
b.	Livestock superintendent	Assistant Team Leader
c.	Livestock Assists /Inoculators	Members
2 a.	Livestock Superintendents	Team Leader
b.	Livestock Assists/Inoculators	Member

16 How many vials of vaccine(s) do you mix at a time in the field ?

(a) 1, (b) 1 - 2, (c) 2 - 3, (d) 3 - 4.

17 While vaccination is in progress, where do you keep the remaining reconstituted vaccine, diluents and the non-reconstituted vaccines ?

(a) Container with ice (b) Container without ice

18 Who mixes/reconstitutes the vaccine(s) in the field ?

i) ( ) Veterinary Doctor

ii) ( ) Animal Health Assistant

iii) ( ) Auxillary/Inoculator

19. Adequacy of vaccines/diluents in the field ?

i) ( ) Adequate ii) ( ) Inadequate

20. How readily does the supply/procurement of vaccines (TCRV)/diluents occur in your locality at the time of vaccination ?

i) ( ) Available ii) ( ) Not available

21. How regular does vaccination of cattle take place in your locality ?

i) ( ) Once a year

ii) ( ) Once every other year

iii) ( ) Has not been done for over two years

iv) ( ) Has not been done at all

v) ( ) Other (Specify)_____

22. How does cattle owners/Fulanis respond to vaccination of cattle against Rinderpest?

i) ( ) They request for it

ii) ( ) They are ready to offer money for the services

iii) ( ) They are indifferent over the vaccination or not interested

iv) ( ) They are interested when there is report of suspected outbreak

23. What vaccination proceduce(s) is/are in use in your locality?

i) TCRV vaccination at a time

ii) TCRV/CBPP vaccination concurrently

iii) No pattern in use

24. Apart from the government sponsored vaccination team, is/are there any other individuals that vaccinate cattle for rinderpest in your locality

i) ( ) Yes, ii) ( ) No, iii) ( ) Unknown

25. If yes, indicate the personel suspected by putting a tick ( ) in the appropriate box(es) below.

i) ( ) Private veterinary Doctors

ii) ( ) Quacks/unqualified personnel

iii) ( ) Other (Specify) _____

26. Indicate the possible problem(s) which may likely result from uncertified vaccination.

i) ( ) Inadequate vaccination coverage

ii) ( ) Vaccination of cattle with materials other than TCRV.

27. In your locality or from your own experience in the field, indicate which of the following letter(s) appropriately showed the correct answer(s) to the question of incomplete hardcoverage in the course of rinderpest vaccination.

a. ( ) Inadequate/Irregular supply of vaccines/diluents

b. ( ) Unwillingness of cattle owners/fulanis to present all their cattle for vaccination.

c. ( ) Introduction of new animals after vaccination.

d. ( ) Little or no publicity given to the vaccination programme.

e. ( ) Inadequate/lack of means of transportation to the field.

28. In your locality, are there any alternative arrangement made for the feeding of the cattle during the dry season?

i) ( ) Yes, ii) ( ) No

29. Name diseases of cattle encountered in your locality _____

_____

30. Name other problems commonly encountered in the field in your locality with regards to rinderpest vaccination programme.

i) _____

ii) _____

iii) _____

iv) _____

31. What is/are the reason(s) behind fulanis refusing vaccination for their cattle

_____

_____

_____

32. Suggest ways of improving the efficiency of the vaccination programme against rinderpest in your locality and the country in general based on your experience in the field.

i) _____

ii) _____

iii) _____

iv) _____

v) _____