# AN ASSESSMENT OF RECENT MEASURES USED TO CONTROL INFLATION IN GHANA

SAMUEL ACHAW GHOSH

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SAMUEL ACHAW OFOSU

DVM (A.B.U.), Diplom (A.I.S. Zschortau - DDR)

M.Sc.
TROPICAL VETERINARY MEDICINE
UNIVERSITY OF EDINBURGH
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CONTENTS

# TEXT TABLES

# TEXT FIGURES

# SUMMARY

RINDERPEST introduced into Gold Coast (Ghana) in 1916, caused heavy losses to the cattle industry and for many years, all attention of the Animal Health Department of Ghana was directed towards the control of the disease. It was, however, only partially controlled until the institution in 1964 of the J.P-15 campaign.

The J.P-15 campaign involved annual vaccination of all susceptible cattle for three consecutive years. A few difficulties were encountered but the end result was favourable. The campaign changed the status quo of the disease and now Ghana can claim to be free of rinderpest.

# Chapter I

## BACKGROUND

Rinderpest is an acute, sometimes subacute, disease of buffaloes and cattle, characterised by fever, severe congestion, haemorrhage and erosions of the mucous membranes of the alimentary tract (Scott, 1967). The disease is contagious. The case mortality rate in susceptible cattle may be high approaching 90 per cent, but may be low in cattle which have had a long association with the disease.

It is caused by a virus which is classified under the family of Paramyxoviridae (Kingsbury, Bratt, Choppin, Hanson, Hoseka, Meulen, Norrby, Plowright, Rott and Wunner, 1978). The disease occurs naturally in all domestic cattle and buffaloes (Plowright, 1968). Scott (1959) in his precis of the characteristics of rinderpest virus, puts the species of the Order Artiodactyla as the natural hosts.

Natural transmission is by droplet infection and most virgin outbreaks have been traced to the introduction of living animals (Scott, 1957). Transmission, however, occurs in pigs when fed on rinderpest infected carcasses (Scott, 1959).

Origin and spread to Africa: Rinderpest has been known for centuries both in Asia, its original home and in Europe. The spread of the disease to the west was favoured by movement of live cattle which

accompanied troops during wars and invasions (Hutyra and Marek, 1926). It caused heavy losses in Europe and led to such historical features as the establishment of the first Veterinary School in Lyon in 1762 and the formation of the State Veterinary Service in the United Kingdom (Anon, 1965a).

Hutyra and Marek (1926) claimed that the first indication of the disease in Africa was in 1841 when cattle were imported from Romania into Egypt. In 1889 the disease was again imported into Africa with the Indian cattle that accompanied Italian army invading Ethiopia (Lugard, 1893). The disease spread in all directions and Lugard blamed the Masai cattle raiders for introducing the disease to the plains of East Africa. From there, the spread was effected through movement of wildlife and cattle. In South Africa, dissemination was facilitated by the widespread use of wagons and coaches drawn by cattle (Mack, 1970).

Losses were heavy both in domestic and game animals. It was so severe that the game of the Zambesi and Limpopo basins were reduced to such small numbers that they were unable to support the tsetse flies in the area. This caused the disappearance of the tsetse flies from the region (Stevenson-Hamilton, 1957). Mortality was often in excess of 95 per cent (Mack, 1970).

Rinderpest also spread westwards, reaching the Cameroons by 1891 with similar mortality as in the south of the continent (Curasson, 1932). The spread of the disease through West Africa was facilitated by movement of cattle caravans and trade cattle. Heavy losses were experienced in West Africa with some herds completely

wiped out. This caused loss of confidence in the cattle industry (Felton and Ellis, 1978). It was even suggested by Felton and Ellis (1978) that the high mortality in the young stock led to the maintenance of older cows in the hope of decreasing losses, and a faster re-establishment of the herd. Meat shortage was acute with high prices for replacement animals. So serious was the question of replacement animals that unborn calves were sold for high prices (Felton and Ellis, 1978).

Rinderpest in Ghana: Rinderpest was first noticed in Ghana, then known as the Gold Coast, in 1916 when the first episootic occurred (Beal, 1920). It lasted for two years and nothing in the form of control was attempted. It was because the only Veterinary Officer was out of the country, fighting as a Captain with the British army in France (Beal, 1973).

The early episootic died out after claiming 50 per cent of the cattle population and was followed by sporadic outbreaks (Beal, 1920). The sporadic outbreaks were caused by movement of infected cattle into Ghana from neighbouring countries. The disease was however not endemic in Ghana, but when it occurred, claimed the lives of calves and yearlings (McKinnon, 1956). The state of immunity in the adult cattle was created by active immunisation of cattle above two years of age (Stewart, 1937). Outbreaks were recorded each year, especially at the borders with the neighbouring countries and occasionally in the indigenous cattle. The mortality rate dropped, however, gradually with the development of more efficient

methods of control (Table 1). The status quo with serious outbreaks being recorded every three to four years was maintained until 1964 when activities of Joint Project No. 15 (J.P-15) were extended to Ghana (Lepissier, 1971b). The incidence of rinderpest, thereafter, fell to zero in Ghana (Lepissier, 1971j).

Early control measures in Ghana: The first recorded attempt at controlling rinderpest in Ghana was dated 1923 when antirinderpest serum was used on a few selected herds (Beal, 1924) (Table 2). In 1925, the serum-virulent virus method which involved double inoculations was introduced (Beal, 1929). The method was to give a longer immunity to the cattle but was found to be unreliable with several disadvantages which included: the blocking out of reactions by the enforced use of virulent virus and serum with consequent non immunisation. Other disadvantages included the necessity for holding cattle for considerable periods at the various immunisation camps (Stewart, 1937). The animals were therefore exposed to other diseases in addition to rinderpest. In 1927, the use of glycerinated bile as vaccine was attempted and 237 cattle were inoculated (Table 2).

The first real constructive step towards the elimination of the disease was taken in 1930, when the first mass, vaccination of cattle started using the serum-virus simultaneous method (Stewart, 1930). The system continued annually until 1937 when it was decided that only the younger susceptible animals were to be vaccinated. At that stage, it was assumed the adult cattle were immune to the disease (Stewart, 1937). Previously, serum was imported and to ensure a

Table 1 Rinderpest in Ghana

| Year | Estimated Cattle Population | Number Vaccinated | Percentage Vaccinated | Number of Outbreaks | Number Dead |
|---|---|---|---|---|---|
| 1930/31 | 137000 | 30000 | 22 | a | 200 |
| 1931/32 | 145000 | 26109 | 18 | b | 800 |
| 1932/33 | 155000 | 44298 | 28 | b | 3000 |
| 1933/34 | 172000 | 30014 | 17 | a | 400 |
| 1934/35 | 192000 | 42302 | 22 | a | 200 |
| 1935/36 | 197000 | 29774 | 15 | b | 1000 |
| 1936/37 | 197000 | 31732 | 6 | a | 200 |
| 1937/38 | 219000 | 12194 | 15 | a | 200 |
| 1938/39 | nd | 31857 | nd | a | 200 |
| 1939/40 | nd | 24018 | nd | a | 200 |
| 1940/41 | nd | nd | nd | b | 800 |
| 1941/42 | nd | 40000 | nd | b | 800 |
| 1942/43 | nd | nd | nd | a | 200 |
| 1943/44 | nd | 41548 | nd | a | 200 |
| 1944/45 | nd | 46000 | nd | a | 200 |
| 1945/46 | nd | 46730 | nd | nd | nd |
| 1946/47 | nd | 44022 | nd | nd | nd |
| 1947/48 | nd | 45892 | nd | nd | nd |
| 1948/49 | 350000 | 10000* | 2 | 75 | 414 |
| 1949/50 | nd | 18000* | nd | 6 | 57 |
| 1950/51 | 389881 | 32211 | 8 | 20 | 2132 |
| 1951/52 | 395160 | 41621 | 10 | 24 | 569 |
| 1952/53 | 430160 | nd | nd | a | 200 |
| 1953/54 | nd | nd | nd | a | 200 |
| 1954/55 | 500000 | 147829 | 30 | 6 | 209 |

nd - No data
a - No detailed data but involved a few herds.
b - No detailed data but involved several herds.
* - Experimental using goat-adapted rinderpest virus.

Table 2 Early vaccinations conducted against rinderpest in Ghana on a few selected herds.

| Year | Serum alone | Serum-virus | Glycerinated Bile | Total |
|---|---|---|---|---|
| 1923/24 | 10192 | nd | nd | 10192 |
| 1924/25 | 4196 | 2494 | nd | 6690 |
| 1925/26 | 4191 | 234 | nd | 6425 |
| 1926/27 | 4952 | 116 | 237 | 5305 |
| 1927/28 | 7338 | 96 | nd | 7434 |

nd - No data.

Source: Beal, 1929.

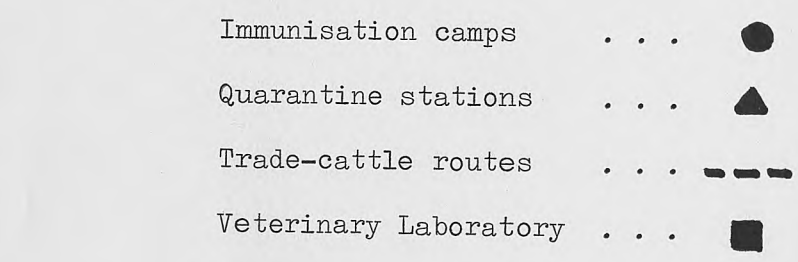
regular supply, a veterinary laboratory was built at Pong-Tamale in 1932 (Stewart, 1932) (Fig. 1).

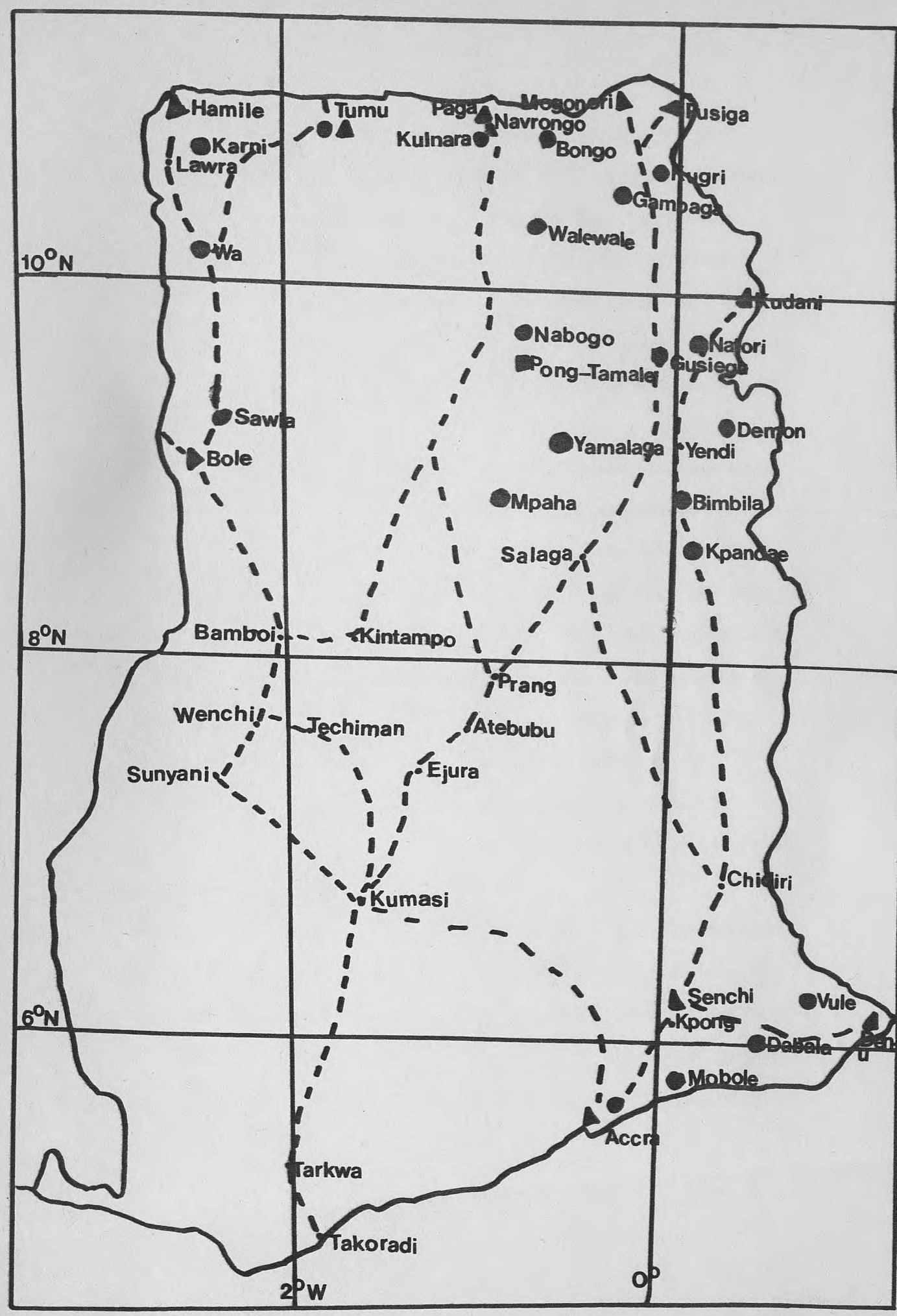
Immunisation camps were erected at vantage points in the cattle rearing areas (Fig. 1). Immunisation teams were also formed which, according to Stewart (1931), consisted of the Section's Veterinary Officer, one or more African Veterinary Assistants, six cattle "patrols" who inoculated and controlled the cattle and two messengers.

The vaccination exercise met difficulties in some districts, especially the Ada area where the stock-owners refused to provide their animals for vaccination (Simpson, 1950; Hutchinson, 1955). The problem was partially overcome when an insurance scheme was established. Under the scheme, cattle-owners paid one shilling for every animal vaccinated and they received one pound for every animal that died at the immunisation camps (Stewart, 1937).

In 1948, goat-adapted virus was used for the first time in Ghana under field conditions. Hitherto, it had been confined to the pure Zebu cattle on the Nungwa Veterinary Station (Simpson, 1949). The goat-adapted desiccated virus was used with caution on humpless cattle. The precautionary measures included, use of the vaccine together with serum and the exclusion of young and unthrifty animals. A low vaccination coverage was recorded in the field attempt with only 10,000 out of the susceptible cattle population of 40,000 vaccinated (Simpson, 1949) (Table 1). The use of the vaccine on the Zebu cattle was popular because it was used alone. Its use, however, on the humpless cattle, was a mere modification of the double inoculation method. In 1949, only 18000 susceptible

Figure 1 Map of Ghana.




Hamile
Tumu
Paga
Mogonori
Pusiga
Navrongo
Kulnara
Bongo
Karni
Lawra
Kugri
Gambaga
Walewale
Wa
10°N
Kudani
Nabogo
Nalori
Pong-Tamale
Gusiega
Sawla
Yamalaga
Yendi
Bole
Mpaha
Bimbila
Salaga
Kpandae
8°N
Bamboi
Kintampo
Prang
Wenchi
Techiman
Atebubu
Sunyani
Ejura
Chiriri
Kumasi
Senchi
Vule
6°N
Kpong
Mobole
Accra
Tarkwa
Takoradi
2°W
0°

animals were vaccinated using the same method (Simpson, 1950) (Table 1). The method was finally replaced by the use of the rabbit-adapted virus method which was used on the humpless cattle with little or no side effects. The animals were inoculated without serum and the other precautionary steps numerated under the use of the goat-adapted virus. Out of 32,211 cattle vaccinated in 1950, 25000 were vaccinated with the lapinised virus alone (Simpson, 1952) (Table 1).

Other control measures included those on the movement and importation of cattle for which the "Importation of Livestock Ordinance of 1925" was passed (Beal, 1925). Records on the use of quarantine stations at the borders with Upper Volta, Togo and Ivory Coast date as far back as 1923 (Beal, 1924). The trade cattle were originally held in quarantine for nine days only. The measure was altered in 1955 to include vaccination of all trade cattle using the goat-adapted virus whilst under quarantine (McKinnon, 1956).

Stock routes were marked through the country (Fig. 1). Imported cattle used such routes which were under regular surveillance of the Veterinary Department.

The annual vaccinations and other control measures brought the disease under check but was not very effective because a small percentage of the cattle population was, in fact, vaccinated (Table 1). Moreover, animals were constantly smuggled across the borders into Ghana causing outbreaks in the yearlings of the indigenous cattle (Beal, 1929).

The first international Veterinary Conference in Ghana was held at Pong-Temale in July 1936 between the Veterinary Directors of Ghana, Nigeria and the Veterinary Director for Dahomey, Togo and Ivory Coast (Stewart, 1937). At the conference, vital issues of veterinary importance were discussed among which was the agreement to vaccinate all cattle in their countries against rinderpest before exporting to Ghana. A resolution was passed at the end of the conference which accepted in principle that "Rinderpest could be eradicated from West Africa with joint international action of control as was done in South Africa and elsewhere" (Stewart, 1937).

The dream became a reality when the joint action against rinderpest in West and Central Africa was initiated under the code name of J.P-15 (The fifteenth joint project of The Organisation of African Unity).

# Chapter II

## CO-ORDINATED CONTROL OF RINDERPEST IN CENTRAL AND WEST AFRICA

The Commission for Technical Co-operation in Africa south of the Sahara (CCTA) in conjunction with its Animal Health branch (IBAH) took the initiative to conduct a joint inter-African, international and multifinanced action against rinderpest in 1962 (Lepissier, 1971b). CCTA/IBAH sponsored the operation in its active phases. The initiative was followed up by the Scientific and Technical Research Commission (STRC) of the OAU, which took over the activities of the former in 1964. The instigator of J.P-15 was W.G. Beaton, a former Director of Veterinary Services, Nigeria and the then Director of IBAH (Lepissier, 1971a).

J.P-15 was planned originally to cover the regions of Niger, Chad, Cameroons and Northern Nigeria surrounding Lake Chad. The States concerned readily accepted the proposal at the CCTA meeting held in Kano in May 1961, to undertake a joint action against rinderpest (Lepissier, 1971b). At the meeting, the objective of the campaign was defined as "To eradicate rinderpest in the regions of Chad, Cameroons, Niger and Northern Nigeria which surround Lake Chad". Other West African States, namely, Dahomey, Upper Volta, Senegal and Western Nigeria who were invited as observers to the meeting immediately asked for the campaign to be extended to cover their respective States. At that same meeting, the method of

approach to achieve the objective was spelt out. It was to be attained by annual co-ordinated anti-rinderpest vaccination campaigns by the Veterinary Departments for three consecutive years. The hope was that all susceptible cattle would be vaccinated at least once. The States were then to adopt sanitary prophylactic measures to eliminate the disease in the case of any future outbreaks and to prevent its entry into the zone once vaccination was completed. The States concerned were to provide the required political and administrative support to ensure complete co-operation of the bodies involved, to effect maximal results.

At a meeting held in Bamako under the aegis of the CCTA in August 1962, it was decided to extend the J.P-15 campaign to Ivory Coast, Dahomey, Northern Ghana, Upper Volta, Mali and Togo, together with the other regions of Nigeria and Niger which were not covered in the phase one (Lepissier, 1971b).

A third and final West and Central African phase of the project was sanctioned at a meeting held in Bathurst in March 1964 to cover the rest of Central and West Africa (Fig. 2) (Lepissier, 1971b). The first phase started from 1962 to 1965, the second phase from 1964 to 1967 and the third, from 1966 to 1969 (Lepissier, 1971b).

## ADMINISTRATION

Dr. H.E. Lepissier, a French Veterinarian, was appointed to run the project and he was given the title of International Co-ordinator (Lepissier, 1971a). He was assisted by Dr. I.M. Macfarlane during the second phase as his deputy co-ordinator.

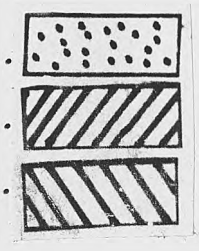
Figure 2 Map of West and Central Africa indicating areas covered by the first three phases of the J.P-15 campaign (Lepissier, 1971b).

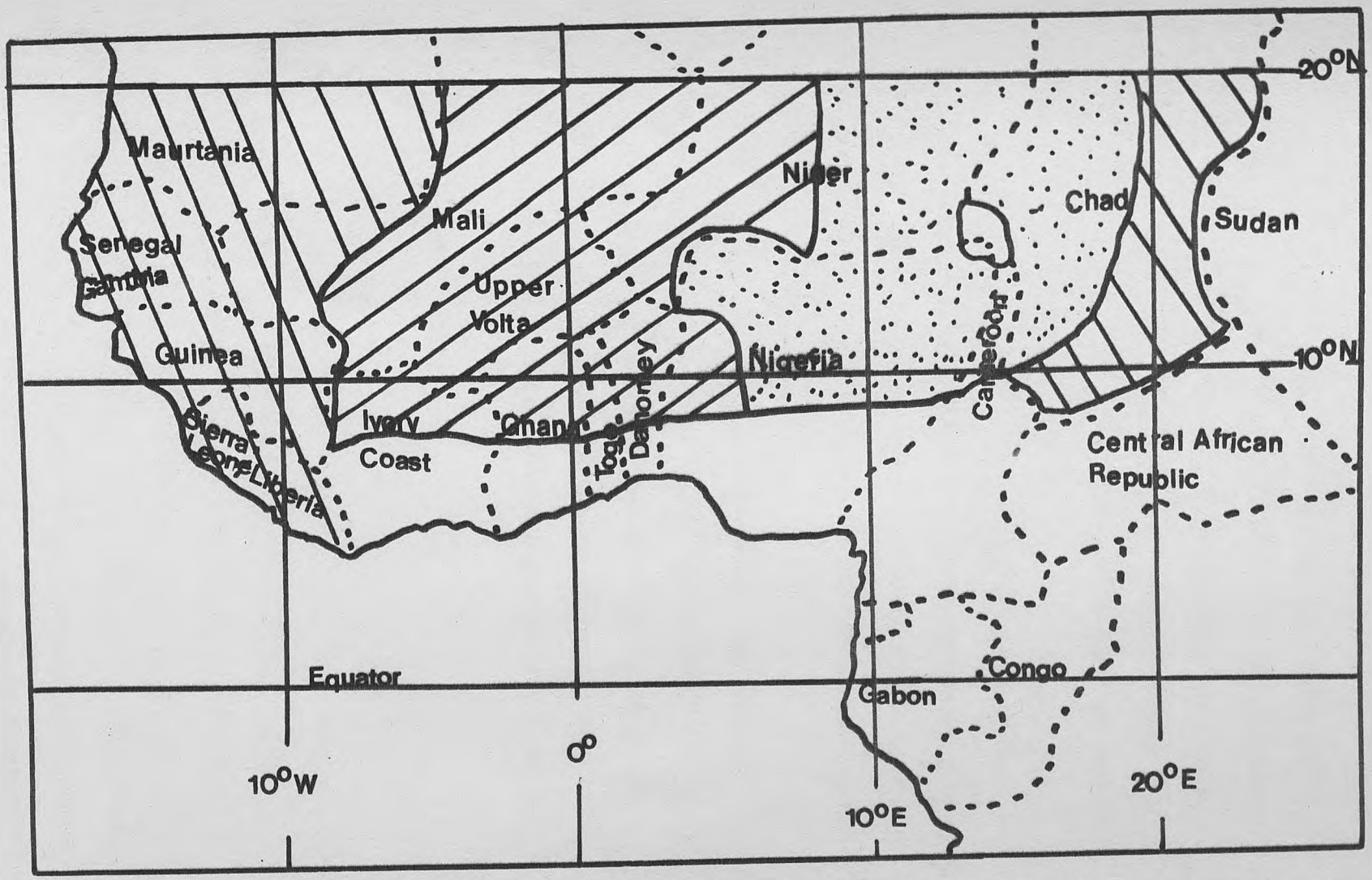
Key

Phase 1 . . .

Phase 2 . . .

Phase 3 . . .




20°N
Mauritania
Mali
Niger
Chad
Sudan
Senegal
Gambia
Upper Volta
Guinea
Nigeria
10°N
Cameroon
Sierra Leone
Liberia
Ivory Coast
Ghana
Togo
Dahomey
Central African Republic
Equator
Congo
Gabon
10°W
0°
10°E
20°E

National Organisers were also selected by the States. They locally controlled the field work and handled the funds involved. The Co-ordinators played the part of liaison between the States concerned, between the States and foreign aid organisations, and between the States and the laboratories and institutes as well as with other international organisations.

Annual Technical Meetings were conducted at which the progress of the campaign was reviewed and faults corrected (Lepissier, 1971d). Monthly reports were prepared by the National Organisers upon which the International Co-ordinator based his quarterly and annual reports (Lepissier, 1971d).

The foreign aid organisations exercised some control through a general check on the execution of the campaign by a Co-ordinator, to whom they entrusted the responsibility (Lepissier, 1971d). Legislation was promulgated in the States previously without legal powers that ensured the co-operation of stockowners (Lepissier, 1971d).

BASIC REQUIREMENTS

Staff: The Veterinary Departments of most of the West African States were considered to be understaffed (Lepissier, 1971e). Ghana required two Veterinarians to help in controlling the campaign. These were provided as the only contribution towards the project by the Canadian Government (Lepissier, 1971e) (Table 3). All Veterinarians for the campaign were recruited from outside Africa whilst the auxillary staff were recruited locally (Lepissier, 1971e). Ghana did not recruit any auxillary staff for the campaign (Table 3).

Table 3 Staff recruited for the J.P-15 Project in Ghana and neighbouring States (Lepissier, 1971e).

| State | Veterinary Officers | Vaccinators | Drivers | Various |
|---|---|---|---|---|
| Ghana | 2 | 0 | 0 | 0 |
| Ivory Coast | 1 | 12 | 4 | 0 |
| Upper Volta | 3 | 50 | 19 | 56 |
| Togo | 1 | 4 | 2 | 0 |

Vaccines: At the first African Scientific and Technical meeting held in 1948, the sero-virus simultaneous method of vaccination was regarded with disfavour (Anon, 1953). At the same meeting, the following standards were set out and vaccines for mass vaccination were expected to be cheap, easy to administer, effective in small doses, have little or no side effects, provide long lasting immunity and be stable. The following vaccines were used during the campaign: Caprinised virus vaccine, lapinised virus vaccine and, finally tissue culture rinderpest virus vaccine (TCV) (Lepissier, 1971g). In Ghana, TCV was the only vaccine used and a total of 1,322,300 doses were imported from Vom and Dakar (Lepissier, 1971g).

Veterinary diagnostic laboratories: Several serious cattle diseases mimic rinderpest clinically. Differentiation necessitate laboratory tests (Scott, 1959). Consequently some of the Veterinary Laboratories were upgraded in terms of equipment, personnel and buildings (Lepissier, 1971g). Thus, the Veterinary laboratories at Vom, Fort Lamy, Dakar and Bamako were upgraded (Lepissier, 1971g). Ghana's laboratory was not upgraded.

Finance: It was realised that the National Veterinary budgets were inadequate for running the project. Foreign aid was sought by the CCTA and later OAU/STRC from the European Development Fund (EDF) which financed the States associated with the European Community apart from Dahomey, Ivory Coast and Togo (Lepissier, 1971c). The latter three States were financed together with the countries not associated with the European Community by the United States Agency

for International Development (Lepissier, 1971c). Aid was also provided by the British, Canadian and Government of the Federal Republic of Germany (Lepissier, 1971c). The foreign aid was intended to supplement the National budgets (Lepissier, 1971c) (Table 4).

Equipment: It was also realised that the States lacked adequate equipment for a successful attempt on the eradication of rinderpest. Equipment was therefore purchased with the foreign aid as required by the individual States (Lepissier, 1971f) (Table 5).

ORGANISATION

The States were divided into Veterinary Districts (Lepissier, 1971h). The Northern part of Ghana was already divided into the North-Western Veterinary Section, North-Eastern Veterinary Section and the Southern Veterinary Section (McKinnon, 1956). The Veterinary Sections were administered by four Veterinary Officers including the two from Canada.

Vaccination teams headed by Senior Technical personnel of the Veterinary Department were put under the Veterinary Officers (Lepissier, 1971h). Cattle were gathered and vaccinated at immunisation camps in liaison with the teams of neighbouring States to ensure that all susceptible cattle were vaccinated (Lepissier, 1965a).

To ensure maximum co-operation and understanding of the cattle-owners, a strong propaganda campaign was mounted (Lepissier, 1971k). It included the use of the radio, newspapers and posters. Gatherings at durbars and market places were exhorted with the aid

Table 4 Details of the National and Foreign aid contributions towards the J.P-15 campaign in Ghana and the neighbouring States (Lepissier, 1971c)

| State | National Contribution | Foreign Aid | Total (£) | Number of Vaccinations |
|---|---|---|---|---|
| Ghana | 195000 | 157005 | 352005 | 1052627 |
| Ivory Coast | 125161 | 287003 | 412164 | 792761 |
| Upper Volta | 469387 | 753976 | 1223363 | 6629537 |
| Togo | 33653 | 67400 | 100053 | 106248 |

Table 5 Details of the equipment purchased for the J.P-15 campaign in Ghana and the neighbouring States (Lepissier, 1971f).

| State | Heavy Vehicles | Light Vehicles | Ice-making Machines | Freezers | Refrige rators | Con- tainers |
|---|---|---|---|---|---|---|
| Ghana | 4 | 8 | 5 | 5 | - | - |
| Ivory Coast | 3 | 2 | 1 | - | 3 | 10 |
| Upper Volta | 13 | 6 | 6 | 7 | 8 | 60 |
| Togo | 1 | 2 | 1 | - | - | 10 |

of radio-vehicles equipped with loud speakers. Mobile cinemas also played a part in educating the rural population.

All cattle over six months of age were vaccinated, earmarked with a clover leaf-shaped punch and numbered (Lepissier, 1971h). The exercise was repeated twice giving a total of 1,052,627 vaccinations in Ghana (Lepissier, 1971i) (Table 4).

## DIFFICULTIES

A few difficulties were encountered during the campaign in Ghana especially during the first vaccination year of 1964/65. Notable among these was the delay on the arrival of equipment for the project which was expected from the United States of America (Lepissier, 1965b). Included in the expected equipment were the American vehicles for the movement of both equipment and the immunisation teams. Because of the delay, vaccination was not started in Ghana until the end of January 1965 (Lepissier, 1965b). The vaccination year started in September/October and ended in May/June before the heavy rains set in. Ghana therefore lost a third of the first vaccination year. In fact the campaign was started without the expected equipment (Lepissier, 1965b).

Another major problem was basically due to the type of husbandry practised in Ghana and neighbouring Ivory Coast. The cattle are kept in such small and scattered numbers that it was difficult to gather all the animals for vaccination (Lepissier, 1965b).

OFFICIAL RESULTS

At the end of the third year of continuous vaccination, the following were released as official results of the J.P-15 campaign.

Number of vaccinations: A total of 1,052,627 vaccinations were undertaken in Ghana. The annual figures were 305,997; 335,512 and 391,118 for 1964/65, 1965/66 and 1966/67 respectively (Table 6) (Lepissier, 1971i).

Cattle population: The National Organiser estimated on the bases of vaccination returns that the cattle population in Ghana was 420,000 in contrast to the previous estimate of 407,790 (Table 7) (Lepissier, 1971i).

The number of unvaccinated adult cattle together with the number of calves under six months of age formed about 20 per cent of Ghana's cattle population at the end of the J.P-15 campaign (Table 7).

Incidence of rinderpest: The number of outbreaks of rinderpest dropped to zero with the J.P-15 campaign (Table 8) (Lepissier, 1971j).

Table 6 Number of vaccinations conducted in Ghana and neighbouring States (Lepissier, 1971k).

| Year | Ghana | Ivory Coast | Upper Volta | Togo |
|---|---|---|---|---|
| 1964/65 | 305997 | 44696 | 1964009 | 0 |
| 1965/66 | 355512 | 43696 | 2306328 | 59663 |
| 1966/67 | 1052627 | 143965 | 6629537 | 106248 |

Table 7 Estimated number of cattle before and after the J.P-15 campaign in Ghana and neighbouring States (Lepissier, 1971i).

| State | Number Before Campaign | Number After Campaign | Total Vaccination | Percentage to Last Estimate | Percentage* Corrected |
|---|---|---|---|---|---|
| Ghana | 407790 | 420000 | 1052627 | 83.42 | 83.54 |
| Ivory Coast | 50000 | 60000 | 143965 | 79.85 | 79.98 |
| Upper Volta | 2400000 | 2500000 | 6629537 | 88.39 | 88.39 |
| Togo | 160000 | 160000 | 106248 | 33.32 | 22.13 |

* Official records exaggerated the percentage covered for Togo, at the end of the scheduled vaccination period.

Table 8 Evolution of outbreaks before and during the campaign in Ghana and neighbouring States (Lepissier, 1971j).

| Year | Ghana | | Ivory Coast | | Upper Volta | | Togo | |
|---|---|---|---|---|---|---|---|---|
| | number sick | number dead | number sick | number dead | number sick | number dead | number sick | number dead |
| 1958 | 46 | 46 | 247 | 147 | 1287 | 539 | - | - |
| 1959 | 56 | 18 | 22 | 8 | 942 | 609 | 24 | 23 |
| 1960 | 30 | 13 | 11 | 11 | 2259 | 1097 | - | - |
| 1961 | 12328 | 630 | 2978 | 1323 | 15565 | 6588 | - | - |
| 1962 | 1053 | 329 | 1437 | 635 | 7518 | 2934 | 27 | 27 |
| 1963 | 26 | 26 | 133 | 27 | 2965 | 1144 | - | - |
| Total | 13538 | 1062 | 4828 | 2161 | 30536 | 12911 | 51 | 50 |
| 1964 | - | - | - | - | 789 | 319 | - | - |
| 1965 | - | - | - | - | 298 | 174 | - | - |
| 1966 | - | - | - | - | 13 | 11 | - | - |
| 1967 | - | - | - | - | - | - | - | - |
| Total | - | - | - | - | 1100 | 504 | - | - |

# Chapter III

## BENEFITS OF THE J.P-15 CAMPAIGN

### AVOIDANCE OF SPECIFIC LOSSES

The havoc wrought by rinderpest was most readily assessed by deaths and losses in milk and meat production. In Nigeria, Felton and Ellis (1978) claimed that there was also a decrease in fertility. Other ill-documented factors in Ghana included losses in dowry, hides and skins, offalls and prestige.

The early epizootics wiped out more than 50 per cent of the cattle population. It was followed by a period when partial control measures were instituted which were alleged to have rendered the adult cattle population immune (Stewart, 1937). McKinnon in his annual report on Ghana's veterinary activities in 1955, disagreed with this fact. He claimed that cattle of all ages were equally affected with rinderpest in Ghana (McKinnon, 1956).

Outbreaks occurred annually even with the partial control measures. Serious waves of disease were recorded every three to four years (Fig. 3). In between these serious outbreaks were recorded minor outbreaks, usually in the yearlings. The minor outbreaks caused a mortality of about 20 per cent. This picture of rinderpest continued until the J.P-15 campaign (Fig. 4; Table 8).

Morbidity and mortality: J.P-15 campaign put a stop to the chain of outbreaks in Ghana starting from 1965. The avoidance of specific

Figure 3 Estimated number of cattle that died from rinderpest in Ghana.

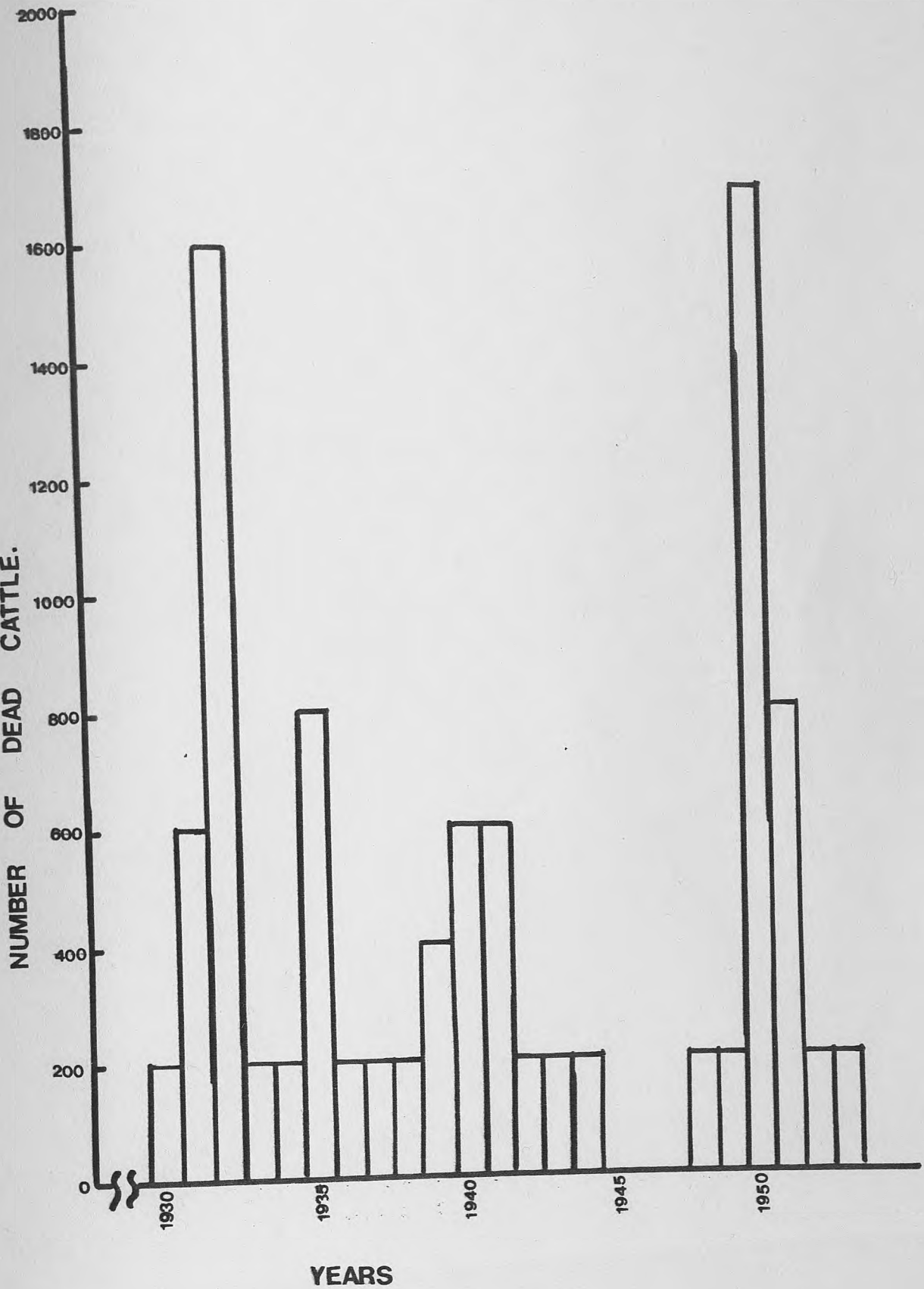
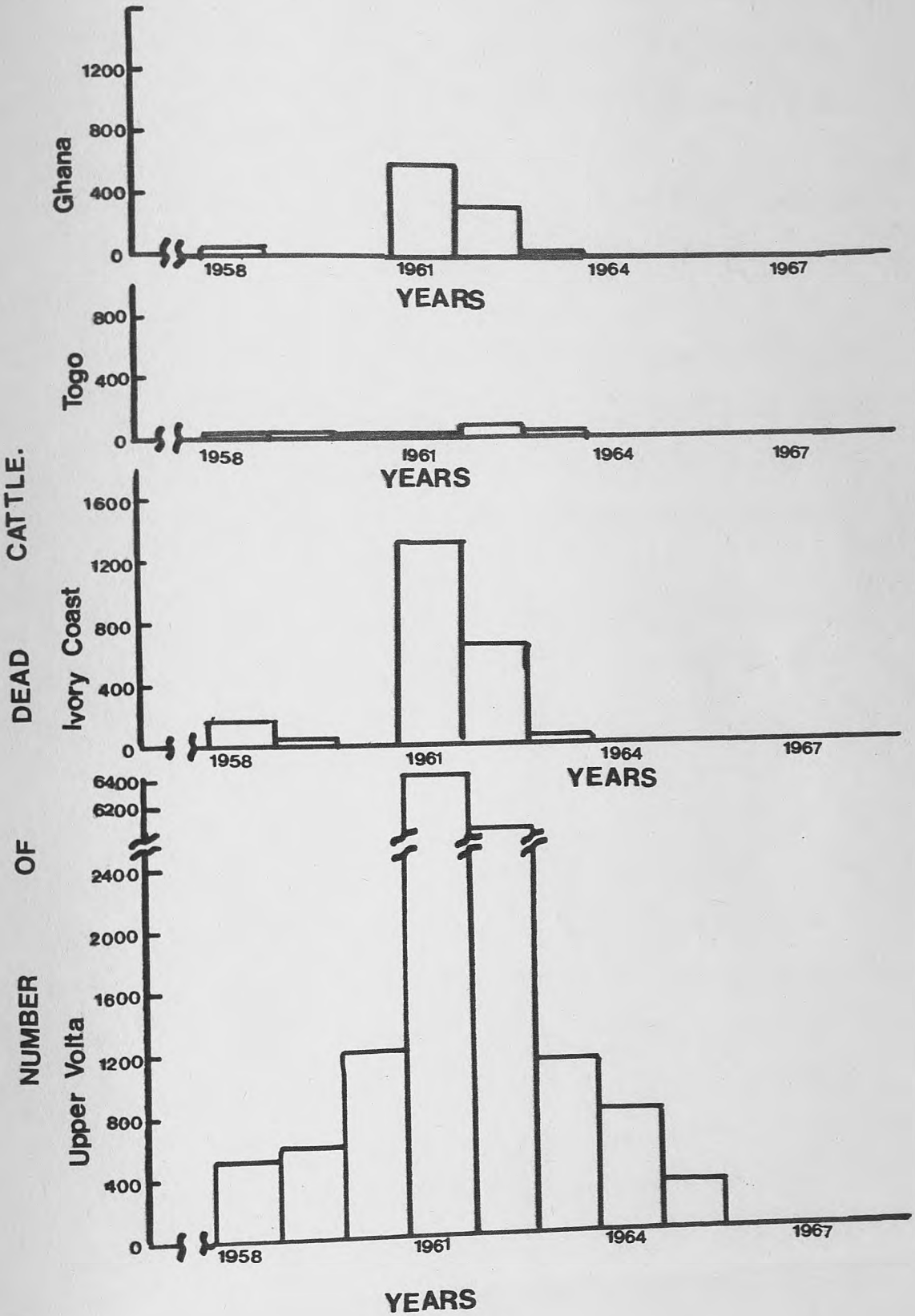

2000
1800
1600
1400
1200
1000
800
600
400
200
0
NUMBER OF DEAD CATTLE.
1930
1935
1940
1945
1950
YEARS

Figure 4 Estimated number of cattle that died from rinderpest in Ghana and neighbouring States after the J.P-15 Campaign.


NUMBER OF DEAD CATTLE.
Ghana
1200
800
400
0
1958
1961
1964
1967
YEARS
Togo
800
400
0
1958
1961
1964
1967
YEARS
Ivory Coast
1600
1200
800
400
0
1958
1961
1964
1967
YEARS
Upper Volta
6400
6200
2400
2000
1600
1200
800
400
0
1958
1961
1964
1967
YEARS

mortality can be supported with figures from Table 8. The mortality dropped from an average of 177 annually to zero, with the J.P-15 campaign. The morbidity dropped also from an annual average of 2256 to zero.

Without the J.P-15 campaign, it would have been reasonable to have expected few or no outbreaks in 1964/65 and serious outbreaks in 1966/67.

The disease in Ghana was introduced from time to time, from neighbouring countries across the borders. The erection of quarantine stations (Fig. 1) only partially checked the introduction of the disease, because animals were often smuggled across the borders into Ghana.

The J.P-15 campaign reduced the incidence of the disease in the neighbouring countries (Table 8). No outbreaks were recorded in Ghana and neighbouring countries in the last vaccinal year.

Cattle population: The vaccination did not cover all the cattle population because the calves under six months of age were not vaccinated and in addition, some animals were not rounded up at the immunisation camps. A susceptible population of these two groups of animals formed about 20 per cent of the total cattle population (Table 7).

The cattle population of Ghana had been growing slowly from the time early control measures were instituted (Table 1). After the J.P-15 campaign there was a dramatic increase in the

cattle population (Table 9; Fig. 5). Within 10 years, the population doubled from 480,000 to 950,000 in 1973. The rapid growth in the cattle population was undoubtedly due in part to a decrease in specific morbidity and mortality and a decrease in calf mortality, factors attributable to J.P-15.

Another factor which contributed to the slow growth in cattle population was the keeping of old unproductive animals. Felton and Ellis (1978) observed that the stock-owner kept old animals as a guarantee against rinderpest. Similarly in Ghana, the stock-owners slaughtered the young animals at festive occasions and kept the old.

J.P-15 changed the cattle herd structure and cattle owners readily sold old animals for slaughter and kept the young productive animals. It is generally accepted in Ghana that the change in husbandry practice was achieved through the education provided after each vaccination exercise to the stock-owners by the veterinary personnel at the immunisation camps.

Milk and meat production: Miller measured the productivity of Ghana's humpless cattle in 1945 (Table 10). The average morbidity of rinderpest infected animals in the six years before the J.P-15 campaign was 2256 annually and the average number of animals that died was 177 annually. In the 10 years after the J.P-15 campaign, the beef saved annually was 177 x 192.5 = 34072.5 lbs and for the decade was 340725 lbs.

Table 9 Cattle population of Ghana during and after the J.P-15 campaign. *

| Year | Cattle population |
|---|---|
| 1964 | 480,000 |
| 1965 | 510,000 |
| 1966 | 528,000 |
| 1967 | 549,000 |
| 1968 | 662,000 |
| 1969 | 690,000 |
| 1970 | 630,000 |
| 1971 | 599,000 |
| 1972 | 950,000 |
| 1973 | 950,000 |
| 1974 | 947,000 |
| 1975 | 947,000 |

* Source: Anon, 1965b, 1966a, 1967a, 1968a, 1969a, 1970a, 1971b, 1972a, 1973a, 1974a, 1975a and 1976.

Figure 5 Growth of cattle population before and after the J.P-15 campaign in Ghana.

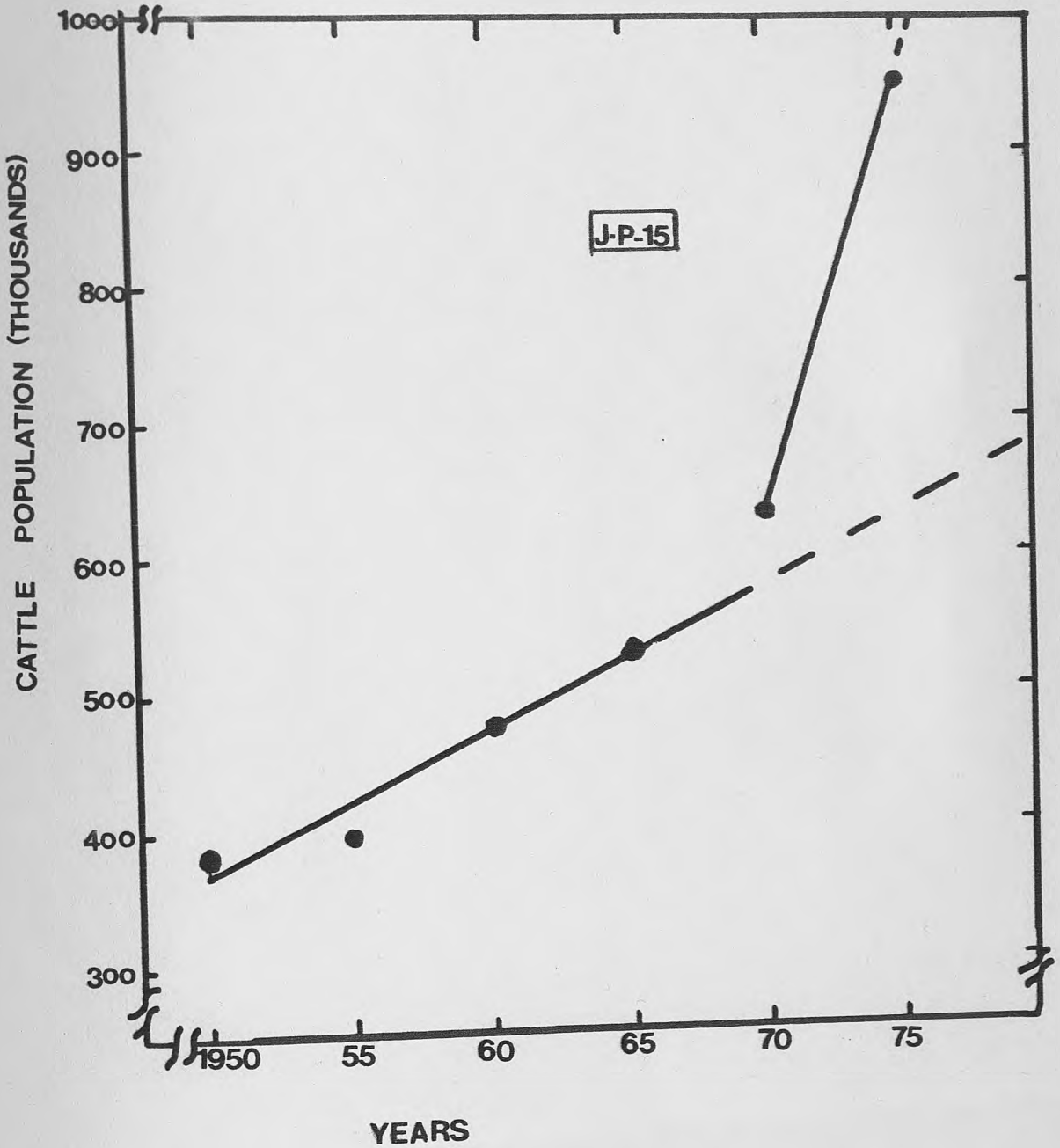

CATTLE POPULATION (THOUSANDS)
1000
900
800
700
600
500
400
300
J-P-15
1950
55
60
65
70
75
YEARS

Table 10 Productivity of Ghana's humpless cattle (Miller, 1947).

| | |
|---|---|
| **Beef Production** | |
| Average liveweight of cattle | 490.5 lbs |
| Carcasse liveweight of cattle | 39 per cent |
| Average dressed carcasse weight | 192.5 lbs |
| **Milk Production** | |
| Average milk yield | 5 lbs |
| Lactation period | 140 days |
| Overall daily milk | 2 lbs |

There was an increase in the production of edible by-products in addition to the increase in beef production. In Ghana, like any other West African State, edible by-products form one-sixth of the total value of the animal (Mittendorf, 1978). It meant quite a substantial amount of edible by-products was saved for human consumption with the J.P-15 campaign.

To assess the specific gains in milk production, the following assumptions were made from Table 11. The cows formed about 45 per cent of the cattle population. Assuming rinderpest affected cattle of all ages which were susceptible equally, then 45 per cent of the sick and dead were assumed to be cows, which meant 1015 cows fell sick annually before the J.P-15 campaign. Seventy nine cows died annually leading to a total of 7794 pounds of milk saved annually in addition to the avoidance of drastic decrease of milk production of the sick cows. Hutyra and Marek in 1926, claimed the milk production of cows dropped drastically when suffering from rinderpest.

Hide production: Rinderpest infected carcasses were destroyed in Ghana. The stock-owners received no compensation for the losses which resulted in their running away from rinderpest infected areas. Unfortunately this spread the disease (Stewart, 1939). The J.P-15 campaign saved at least 177 hides annually which were either processed into leather or eaten.

Table 11 Number of cows in Ghana[+].

| Year | Number of Cattle | Number of Cows | Percentage |
|---|---|---|---|
| 1947-1952 | 374000 | 141000 | 38 |
| 1952-1956 | 395000 | 150000 | 38 |
| 1960/61 | 470000* | 214000* | 46 |
| 1961/62 | 480000 | 226000 | 47 |
| 1962/63 | 480000* | 239000* | 50 |
| 1963/64 | 505000* | 252000* | 50 |
| 1964/65 | 510000 | 264000 | 52 |
| 1965/66 | 528000* | 272000* | 52 |
| 1966/67 | 549000* | 275000* | 50 |
| 1967/68 | 662000* | 280000* | 42 |
| 1968/69 | 690000* | 290000* | 42 |

* Estimated population

\+ Source: Anon, 1967b and 1971a.

Social gains: The social reasons for keeping cattle in Ghana included the paying of dowry and as a sign of wealth. Cattle were also kept and slaughtered on festive occasions, especially during funerals and as offering to the gods. Rinderpest, therefore, adversely influenced social occasions in Ghana. Fathers could not pay the bride price for their sons' marriages and the gods did not get the wanted animals until the J.P-15 campaign.

VETERINARY DEPARTMENT OF GHANA

Staff: The Veterinary Department of Ghana was understaffed before the J.P-15 campaign, especially in the field of professional veterinarians. Each veterinarian was responsible for at least 51,320 livestock units, a responsibility that compared very unfavourably with those of other countries (Table 12). It was therefore necessary to recruit Messrs Armour and Morris as veterinarians to supplement the staff of Ghana.

The recruitment of the veterinarians from outside, stimulated the Department of Veterinary Services to send more students to train as veterinarians. The students studied in the United Kingdom, USA, Canada, Soviet Union, Nigeria and Kenya. Others were sent to East Germany, West Germany and Yugoslavia.

The training of the Veterinarians increased annually and within five years of the J.P-15 campaign, the number of Veterinarians had doubled. It increased five fold within a decade. Thus, in 1974, there were 47 Veterinarians (Table 13; Fig. 6).

Table 12 Livestock units* per Veterinarian.

| Country | 1963 | 1976 |
|---|---|---|
| United Kingdom | 2508 | 2837 |
| Japan | 195 | 206 |
| Brazil | 25614 | 10726 |
| Ghana | 51320 | 22141 |
| Australia | 24423 | 13849 |
| Spain | 821 | 742 |
| Portugal | 2257 | 2791 |
| West Germany | 1602 | 1765 |

* Livestock units calculated from the total livestock population of cattle, sheep, goats and pigs using the FAO recommended conversion of 1.1 units for camels; 1.0 unit for buffaloes, horses and mules; 0.8 unit for cattle and asses; 0.2 unit for pigs and 0.1 unit for sheep and goats (Anon, 1971a).

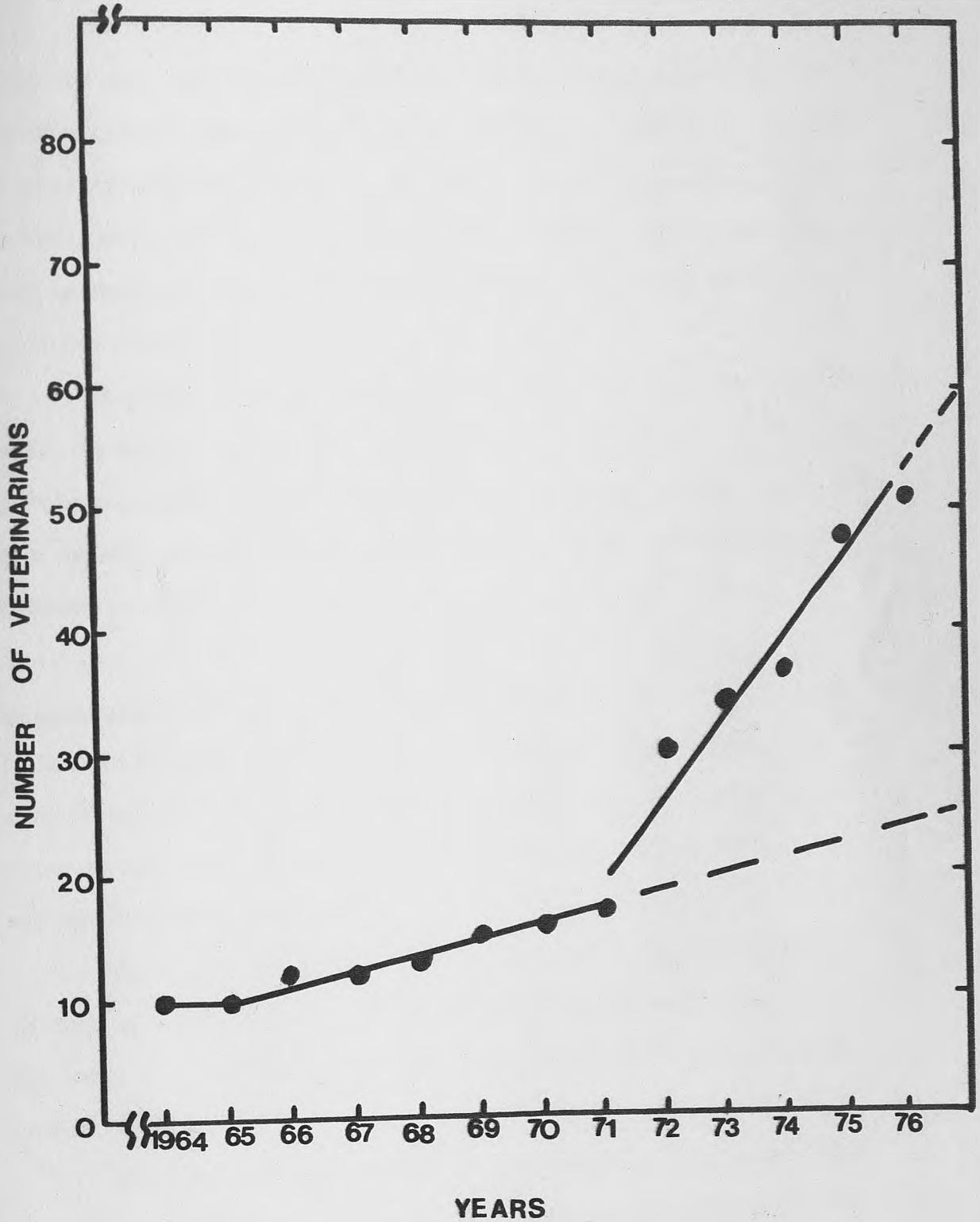
Table 13 The number of Veterinarians in Ghana during and after the campaign +.

| Year | Veterinarians | |
|---|---|---|
| | Published | Amended* |
| 1964 | 10 | 10 |
| 1965 | 10 | 10 |
| 1966 | 10 | 12 |
| 1967 | 10 | 12 |
| 1968 | 10 | 13 |
| 1969 | 10 | 15 |
| 1970 | 23 | 16 |
| 1971 | 23 | 17 |
| 1972 | 23 | 30 |
| 1973 | 23 | 34 |
| 1974 | 47 | 37 |
| 1975 | 56 | 47 |
| 1976 | 56 | 51 |

* Amendment derived from personal experience.

\+ Source: Anon, 1965b, 1966a, 1967a, 1968a, 1969a, 1970a, 1971b, 1972a, 1973a, 1974a, 1975a and 1976.

Figure 6 Number of Veterinarians in Ghana.


NUMBER OF VETERINARIANS
80
70
60
50
40
30
20
10
0
1964
65
66
67
68
69
70
71
72
73
74
75
76
YEARS

The drastic increase in the Veterinarians occurred in 1972, the year the students recruited in the final year of the J.P-15 campaign passed out as Veterinarians. In 1976, there were 51 Veterinarians as against 10 in 1966. Each Veterinarian was, however, responsible for at least 22141 livestock units, a responsibility which was still too much when compared with those of other countries (Table 12).

The Department of Veterinary Services had sufficient auxillary staff, to undertake the J.P-15 campaign. The increase in the number of Veterinarians, however, required more auxillary staff. To meet this demand, extensions were made on the Pong-Tamale Veterinary Training school.

Laboratories: Ghana had one Veterinary Laboratory before J.P-15. It was constructed in 1932 and it produced anti-rinderpest vaccines, anti-rinderpest serum and contagious bovine pleuro-pneumonia vaccine. Other biologicals produced at the laboratory included fowl pox vaccine (Stewart, 1938).

Ghana did not receive any improvement on her veterinary laboratory during the J.P-15 campaign and therefore relied on Vom and Dakar for TCV, which was the latest rinderpest vaccine on the market.

More veterinary laboratories were, however, erected after J.P-15, and these were sited at Accra, Kumasi and Takoradi. The veterinary laboratories are under the care of veterinarians, trained as Tropical Veterinary Science Officers. It is generally

accepted in Ghana that the construction of more modern veterinary laboratories stemmed out of the fact that the veterinary laboratory at Pong-Tamale was not upgraded for the J.P-15 campaign.

A training course has been organised for veterinary laboratory technicians also at Pong-Tamale. The course is to upgrade the standards of the assistants who work with the veterinarians in the laboratories.

Attitude to work: The Veterinary Departments of most of West African States were not used to mass vaccination exercises. There was very little done in some of the States and in fact most of the States' Veterinary Departments were 'dead' (Lepissier, 1971e). The Veterinary Department of Ghana, on the other hand was used to annual mass vaccinations (Table 2).

J.P-15 introduced some new management techniques into the Veterinary Department of Ghana. Annual Technical Meetings were held at the end of each vaccination year (Lepissier, 1971d). Review of the work done within the year was undertaken and faults were corrected at the Technical Meetings. This practice was absorbed by the Veterinary Department of Ghana. The annual Senior Staff Meeting of the Veterinary Department of Ghana was created from the successes attained out of the annual Technical Meetings of the J.P-15. The Director of Veterinary Services of Ghana supported this claim at the ninth Senior Staff Conference held at Bolgatanga in August 1976. He noted that "It was at the end of the rinderpest campaign in 1967 that it was thought necessary that the senior staff

should meet regularly, once a year to discuss problems facing the department and to draw up an annual programme to be followed by the field staff" (Quartey, 1976).

Knowledge gained: Much knowledge was gained out of the J.P-15 campaign. Most important of the acquired knowledge was the new approach to work.

It was during the J.P-15 campaign that TCV was introduced to Ghana (Lepissier, 1971g). Ghana has since then been using only TCV in vaccinating cattle against rinderpest (Personal experience). It was learnt at the J.P-15 campaign that TCV was safer to use on the humpless cattle of Ghana. TCV caused little or no side effects even in undernourished and sick animals. The stimulation of latent protozoal infections by the other vaccines was not experienced with the use of TCV. This resulted in no deaths occurring out of the vaccination of J.P-15.

The spirit of working as a team was broadened. The co-ordinators kept in touch with eminent authorities on rinderpest like Professor Jacotot, of Pasteur Institute and Doctors Scott and Plowright. New developments in the field of rinderpest were passed over to the field staff. It was during such meetings that Plowright advised that TCV preserved better when reconstituted with cold physiological saline as compared with distilled water (Lepissier, 1971h).

## IMPROVEMENTS IN THE CATTLE INDUSTRY

Herd structure: Stock-owners in Ghana lost heavily from the virgin epizootics of rinderpest in 1916. Most herds were reduced by 50 per cent and some herds were completely wiped out (Beal, 1920; Stewart, 1936). The adult cattle which survived became immune but subsequent outbreaks decimated the population of the yearlings (Stewart, 1936). The farmers therefore had no alternative than to keep the old indigenous animals whilst the young cattle were slaughtered until J.P-15 (Felton and Ellis, 1978). The herd structure was worsened in some areas in Ghana where only young animals were offered to the gods and at festive occasions (Stewart, 1936).

The herd increased so rapidly with J.P-15 that it became necessary to slaughter more animals. There were no more outbreaks in Ghana for nearly ten years with J.P-15 (Table 14). It was therefore unnecessary to keep the old animals as a guarantee against the disease.

The farmers readily accepted advice from the Department of Animal Husbandry to sell out the old females and to maintain productive young animals (personal experience). Unfortunately, this practice was abused when the farmers slaughtered both old and young animals indiscriminately; it resulted in the enforcement of the legislation on slaughter in some regions of Ghana. The legislation disallowed the slaughter of females and Veterinarians used their discretion to decide which animals were to be slaughtered (personal experience).

Cattle population figures: In 1914 the first cattle population census was attempted in Ghana. Only 16,000 cattle were counted in Northern Ghana because the herds were scattered and therefore difficult to reach in those days (Simpson, 1951). The early vaccinations enabled the cattle to be gathered at immunisation camps where they were counted (Stewart, 1937; Simpson, 1950; McKinnon, 1955). In 1941, another cattle population census was attempted which gave 170,000 as the cattle population of Ghana (Simpson, 1951). In 1952/53 the world census of livestock produced 430,160 as the estimated cattle population of Ghana (Simpson, 1953).

It was realised that the stock-owners did not provide all their cattle for counting and therefore the results from the 1952/53 census were estimated. The cattle owners' refusal to provide all their cattle for counting was an attempt to evade tax, which was based on the herd size (Felton and Ellis, 1978).

Cattle owners were strongly educated on the importance of J.P-15. It was also made clear to the farmers that the figures to be obtained from the J.P-15 exercise would not be used for tax purposes (Lepissier, 1971k). The co-operation of the cattle owners was good and it was realised that the cattle population figure was higher than it was before the campaign (Table 7).

In Chad, tax collection was conducted at immunisation camps during J.P-15 (Lepissier, 1971k). This resulted in chaos and some farmers refused to present their herds. Ghana did not encounter such problems and it was accepted after J.P-15 that the cattle population figures then were the more accurate figures.

Relationship between cattle owners and the Veterinary Department: The establishment of the Veterinary Department in Ghana was welcomed by all stock-owners. A good relationship was established by the first Veterinary Officer, Beal, and was so profound that all Veterinary personnel were known as "Billi" (Stewart, 1930).

The good relationship, however, dwindled in 1951/52 when an outbreak of rinderpest swept through an immunisation camp and killed a high percentage of the cattle which had gathered for vaccination (Simpson, 1952). There was unrest and misunderstanding between the stock-owners and the Veterinary Department. Annual vaccination was suspended temporarily until the Department had rechecked its vaccine and serum production (Simpson, 1953). Mass vaccination was started again in 1953 but not without difficulties. Some cattle owners refused to provide their stock for vaccination (Hutchinson, 1954).

The education given to the stock-owners prior to J.P-15, supported by the results obtained after J.P-15, restored confidence once more. Cordial relationship was re-established with the Veterinary Department as was shown by the readiness at which stock-owners provided their animals for vaccination. Some farmers chased the veterinary personnel up to cover their animals even before their areas were due for the annual vaccination (personal experience, 1976/77).

# Chapter IV

# DRAWBACKS

## POST-CAMPAIGN SANITARY PROPHYLAXIS

The J.P-15 campaign was to be followed by post-vaccination prophylactic measures (Lepissier, 1971j). The measures included the immediate reporting of outbreaks of rinderpest using the method set up by IBAH for recording outbreaks of the disease. The outbreaks were to be controlled by ring vaccination of all cattle within a radius of 15 Km and the slaughtering of all sick and in-contacts. Other measures, according to Lepissier (1971j), included annual vaccination of yearlings which otherwise would form a susceptible population.

The States were also expected to institute measures to prevent the re-introduction of the disease. The last measure placed Chad in a responsible position to prevent the re-introduction of the disease in Central and West Africa from Sudan. Sudan had not been covered by the J.P-15 campaign and was the main source of the disease in Chad (Lepissier, 1971c).

Most of the Sahelian States supplied trade cattle to Ghana. Harrison Church (1974) claimed two-thirds of Ghana's trade cattle were imported from Mali and Niger. The other countries which supplied Ghana with trade-cattle included Nigeria and Upper Volta.

In addition to the movement of the trade-cattle, there were the seasonal migration of nomads and their herds in search of food and water (Ellis and Hugh-Jones, 1976). The movements were not

adequately controlled. Diseases disseminated along with the movements included rinderpest, foot-and-mouth disease and contagious bovine pleuropneumonia (Ellis and Hugh-Jones, 1976).

Under the financial agreements signed with the aid organisations, the States were to ensure that the post-campaign prophylactic measures were strictly adhered to and it was hopefully expected that the incidence of the disease would drop (Lepissier, 1971c). Unfortunately most of the States lacked adequate funds to follow-up the campaign with adequate sanitary measures.

According to Lepissier (1971c), some of the States put all their resources into the J.P-15 campaign neglecting other activities of the States' Veterinary Departments. No provision was made under the financial agreements towards the upkeep of post-campaign prophylactic measures. Most of the countries therefore could not honour the agreements.

Some of the States charged for vaccination which undoubtedly frightened the stock-owners (personal experience). On the other hand, stock-owners presented their cattle for vaccination when they were convinced that an outbreak was imminent.

Chad was to establish a "cordon sanitaire" along her border with Sudan to be supervised by a team of veterinary personnel. The country however had political unrest which resulted in the death of a J.P-15 recruited Veterinarian (Lepissier, 1971j). The death disrupted the campaign and post-campaign sanitary measures. Serious outbreaks occurred in the last year of the J.P-15 campaign (Lepissier, 1971j) (Table 14). There was, however, a decrease in the number of

Table 14 Rinderpest outbreaks in Ghana and her sources of trade-cattle during and after the J.P-15 campaign*.

| Year | Ghana | Niger | Ivory Coast | Nigeria | Upper Volta | Mali | Chad |
|---|---|---|---|---|---|---|---|
| 1962 | 7 | 133 | 3 | 3 | 155 | 32 | 86 |
| 1963 | 13 | 60 | 2 | 25 | 20 | 149 | 60 |
| 1964 | 1 | 54 | - | 1 | 29 | 166 | 49 |
| 1965 | - | 2 | - | 1 | 26 | 71 | 3 |
| 1966 | - | 4 | - | 1 | 1 | 55 | 40 |
| 1967 | - | 4 | - | 5 | - | - | 30 |
| 1968 | - | 9 | - | 27 | - | 2 | 17 |
| 1969 | - | 15 | - | 54 | 1 | - | 20 |
| 1970 | - | 6 | - | 24 | 16 | 2 | 14 |
| 1971 | - | - | - | 97 | 26 | 36 | 5 |
| 1972 | - | 11 | 12 | 19 | - | 30 | - |
| 1973 | 3 | 7 | - | - | 6 | - | 2 |
| 1974 | 1 | - | - | 7 | - | - | - |
| 1975 | - | - | 1 | - | - | - | - |

* Source: Lepissier, 1971j; Anon, 1964; 1965c; 1966b; 1967c; 1968b; 1969b; 1970b; 1971c; 1972b; 1973b; 1974b; 1975b.

outbreaks in Chad after that year and it was hoped the disease could be controlled if post-campaign measures were followed.

An analysis of outbreaks of rinderpest after J.P-15 indicates that post-campaign sanitary measures were not fully implemented in Mali, Upper Volta, Niger, Nigeria and Chad (Table 14). These countries unfortunately supplied Ghana with trade-cattle.

Ghana on the other hand continued with annual vaccination campaigns and covered most trade cattle too (personal experience). The country was free from the disease after the first year of the J.P-15 campaign (Lepissier, 1971j) (Table 14). The threat of re-introduction of the disease was limited to the few smuggled animals, which could transmit the infection to the unvaccinated yearlings. Thus, in 1973, outbreaks were recorded in Ghana (Anon, 1973). These were minor outbreaks and involved only the yearlings. Another outbreak was recorded in 1974 in Ghana (Anon, 1974). The disease has since then been under control with no known outbreaks (personal experience). The chances of the disease being re-introduced into Ghana are great unless the other West and Central African States adhere equally to the post-campaign sanitary measures.

INACCURATE DATA

Misdiagnosis: Diagnoses of rinderpest were conducted in the field and were based on the clinical signs and postmortem findings. Most were assumed to be correct especially when conducted by experienced Veterinarians. Rinderpest, however, is often confused with diseases which present clinically similar manifestations. Such diseases

include coccidiosis, mineral poisoning, plant poisoning, salmonellosis and virus diarrhoea-mucosal disease (Scott, 1967). In West Africa, some cases exhibited abortive reactions as claimed by Scott in 1967. It is therefore necessary to have cases confirmed by laboratory findings.

Lepissier (1971j) emphasised that the number of confirmed cases was far below the number provisionally diagnosed. This gave the implication, perhaps erroneously, that the field diagnoses were wrong. The correct diagnosis of rinderpest was necessary, however, to provide the correct impression of the rinderpest situation. It was also psychological for if not done, many people might assert in all good faith, but mistakenly perhaps, that rinderpest was still rife in the zones where J.P-15 campaign was carried out.

The correct application of IBAH's obligatory system of locating outbreaks was not strictly adhered to. For example, 24 outbreaks recorded in Cameroon in 1966/67 were reduced to only six when the correct system of locating outbreaks was applied (Lepissier, 1971j).

Confirmation of immunity: The rinderpest vaccines used in Ghana before J.P-15 campaign resulted in mild reactions, which were assumed to indicate immunity had been established in the cattle (Stewart, 1937).

The TCV used during the J.P-15 campaign presented little or no reactions in the animals which made the assessment of the state of immunity in the field difficult. Lepissier (1971i) claimed two methods were devised for this in West Africa.

Vaccinated cattle were challenged in the field using the caprinised vaccine and then the evolution of the resultant thermal graph was followed for 10 to 14 days. Non-immunised cattle reacted whilst immunised cattle showed no reactions. The other method involved the laboratory in sero-neutralisation tests. The States undertook only a few of such tests which necessitated personnel and funds (Lepissier, 1971i). The work carried out in the bush from the vaccination point of view did not receive the necessary laboratory confirmation.

The TCV used in Ghana was a delicate vaccine which required such precautionary measures like the reconstitution of the vaccine with sterile chilled physiological saline and it was to be used within two hours after reconstitution. It also required that such reconstituted vaccine should be kept in the shade and surrounded by ice during this period (Singh, 1968). These characteristics of the vaccine in addition to the several conditions favourable for the fast deterioration of the vaccine in the tropics, required that a large percentage of the vaccinated animals should have been tested for immunity.

The non-confirmation of immunity after the J.P-15 campaign was a flaw, because the immune status of the herds was unknown.

## PROBLEMS WITH INCREASED OFFTAKE

J.P-15 campaign concentrated all attention on the eradication of rinderpest. No attention was given to what would happen if the disease was removed and the cattle population increased. This invariably happened and the ravages associated with the recent drought

in the Sahelia were allegedly exacerbated by the recent increase in the cattle population (Reid, 1973). It was further explained by Reid (1973), that the drought was compounded in its effect by overgrazing and human mismanagement. The view was shared by Griffiths (1976), who noted in his article on International Control of Animal Diseases that "a weakness of the J.P-15 campaign has been insufficient attention was paid during the campaign to increasing the offtake of the stock for slaughter". He further elaborated by drawing attention to the alleged overstocking in some areas as proof of his claim.

Felton and Ellis (1978) held a dissident view. Their final conclusion after extensive survey work done on the rinderpest control in Nigeria was "that the J.P-15 campaign paved the way to a return to a more efficient cattle herd structure prior to the drought and that it could not have contributed significantly to the overstocking in the drought period".

In Ghana, the problem of overstocking was allegedly known to be in existence before the J.P-15 campaign (Stewart, 1937). The rapid increase in the cattle population undoubtedly worsened the situation if there was overstocking problems before the J.P-15 campaign. Vast areas of grassland are, however, unexploited for grazing because these areas are infected with human oncocerciasis, thereby rendering the areas uninhabitable (Allan, 1967).

The alleged overstocking requires more extensive field work to spell out the present stocking rates and the stocking capacity of the cattle rearing areas of Ghana.

# Chapter V

## DISCUSSION AND CONCLUSION

### BENEFITS

Three obvious achievements can be attributed to the J.P-15 campaign. These were the contribution to the increase in cattle population, avoidance of rinderpest morbidity and mortality and the increase in the number of Veterinarians in the country.

Cattle population: The growth in the cattle population in the pre-J.P-15 era was much slower than in the post-J.P-15 era (Table 2). There was a rapid increase in the cattle population after the J.P-15 campaign (Table 9). It rose from 395,160 in 1952 to 480,000 in 1964. It rose however from 510,000 in 1965 to 947,000 in 1975.

The expected cattle population with the J.P-15 campaign was 614,450 in 1975 (Table 16). There was therefore a significant increase in the cattle population in the post-J.P-15 campaign era, which however cannot be attributed wholly to the institution of the J.P-15 campaign. Other factors have possibly contributed to the increase in the cattle population: factors such as the provision of more water for the cattle and improvement in general husbandry practices in addition to a possible decrease in the incidence of other diseases.

Table 15 Ghana's cattle population before the J.P-15 campaign

| Year (X) | Cattle Population (Y) in thousands |
|---|---|
| 52 | 374 |
| 56 | 395 |
| 61 | 470 |
| 62 | 480 |
| 63 | 480 |

Table 16 The expected cattle population and expected incidence of rinderpest without the J.P-15 campaign in Ghana

| Year | Expected Cattle Population | Expected Morbidity | Expected Mortality |
|---|---|---|---|
| 65 | 495760 | 2743 | 214 |
| 66 | 506550 | 2802 | 219 |
| 67 | 528130 | 2922 | 228 |
| 68 | 538920 | 2981 | 234 |
| 69 | 549710 | 3041 | 238 |
| 70 | 560500 | 3101 | 243 |
| 71 | 571290 | 3160 | 248 |
| 72 | 582080 | 3220 | 252 |
| 73 | 592870 | 3280 | 257 |
| 74 | 603660 | 3339 | 262 |
| 75 | 614450 | 3399 | 266 |

The cattle population calculated from the equation

$$Y = 10.79X - 194.80 \ldots\ldots \quad (1)$$

The morbidity was calculated from the fact that the morbidity in Pre-J.P-15 era was about 0.6 per cent and case mortality was 7.8 per cent.

Avoided morbidity and mortality: There was an annual average morbidity of 2256 and mortality of 177 in the pre-J.P-15 campaign era (Table 8). It meant that only about 0.6 per cent of the whole cattle population of 407,790 contacted the disease whilst the case mortality was 7.8 per cent. The avoidance of these could not have alone caused the rapid increase in the cattle population. For example, the expected mortality in 1975 without the J.P-15 campaign was 266 (Table 16). The morbidity in the same year without the J.P-15 campaign was expected to be 3399 (Table 16).

On the other hand, the increase in the cattle population with the J.P-15 campaign was 332550 in 1975 (Table 18). The increase therefore could not have possibly been due to the avoidance of 3399 sick and 266 deaths alone. It is, however, likely that the accumulative effect of the annually avoided morbidity and mortality subsequently contributed to the rapid increase in the cattle population.

The incidence of rinderpest was expected to increase without the J.P-15 campaign, because the cattle population was expected to increase (Table 16). An estimated number of 33988 cattle were expected to have fallen sick within the period 1965 to 1975 whilst a total of 2661 deaths would have been recorded without the J.P-15 campaign (Table 16). Both were avoided with the J.P-15 campaign.

Financial benefits on the avoided mortality have been calculated, and a discounted value of £338,704.2 accrued out of

Table 17 Cattle population of Ghana, counted after the J.P-15 campaign *

| Year (X) | Cattle population in thousands (Y) |
|---|---|
| 68 | 662 |
| 69 | 690 |
| 70 | 630 |
| 71 | 599 |
| 72 | 950 |
| 73 | 950 |
| 74 | 947 |
| 75 | 947 |

* Source: Anon, 1969a; 1970a; 1971b; 1972a; 1973a; 1974a; 1975a; 1976.

Table 18 Comparison of the cattle population after the J.P-15 campaign and that expected without the J.P-15 campaign.

| Year | Cattle Population after the J.P-15 | Expected Cattle Population without J.P-15 | Increase in Cattle Population after J.P-15 |
|---|---|---|---|
| 65 | 510000 | 506550 | 3450 |
| 66 | 528000 | 517340 | 10660 |
| 67 | 549000 | 528130 | 20870 |
| 68 | 662000 | 538920 | 123000 |
| 69 | 690000 | 549710 | 140000 |
| 70 | 630000 | 560500 | 69000 |
| 71 | 599000 | 571290 | 27000 |
| 72 | 950000 | 582080 | 367920 |
| 73 | 950000 | 592870 | 357130 |
| 74 | 947000 | 603660 | 343340 |
| 75 | 947000 | 614450 | 332550 |

The expected cattle population with J.P-15 calculated from the equation

$$Y = 10.79X - 194.80$$

this alone at the end of the first 10 years of the J.P-15 campaign (Table 19). An animal was valued at ₵200.00 for that calculation which was the value in 1964 (personal experience). It was assumed that the value did not change.

The discounted value on avoided mortality was the minimum financial benefit obtained from the J.P-15 campaign. The maximum financial benefit cannot be calculated because some of the numerated benefits cannot be quantified. It is probable that such gains were not insignificant.

Veterinary Department: The Veterinary Department of Ghana expanded in all fields with the J.P-15 campaign. Most significant and worth discussing was the rapid increase in the number of Veterinarians (Table 13; Fig. 6). The number increased slightly during the J.P-15 campaign but that increase cannot be attributed to the J.P-15 campaign because the veterinary students' training started five years before the J.P-15 campaign.

The J.P-15 campaign, however, stimulated the increase in the rate of training Veterinarians and since the training normally covered a period of five years, the effect of the increase in the rate of training Veterinarians was noticed five years after the institution of the J.P-15 campaign (Table 22). There were thus 51 Veterinarians in 1976 whilst the number without the J.P-15 campaign could only have been expected at 22 in the same year (Table 21). The increase was significant and resulted in a drastic decrease in the number of livestock units per Veterinarian. It was 51320 in 1963, but decreased to 22141 in 1976 (Table 12).

Table 19 Discounted value on avoided mortality in Ghana after the J.P-15 campaign

| Year | Expected mortality | Actual Mortality | Cattle Saved | Value of Cattle Saved ($) | Value Discounted at 10 per cent |
|---|---|---|---|---|---|
| 1965 | 214 | 0 | 214 | 42800 | 42800 |
| 1966 | 219 | 0 | 219 | 43800 | 39814.2 |
| 1967 | 228 | 0 | 228 | 45600 | 37665.6 |
| 1968 | 234 | 0 | 234 | 46800 | 35146.8 |
| 1969 | 238 | 0 | 238 | 47600 | 32510.8 |
| 1970 | 243 | 0 | 243 | 48600 | 30180.6 |
| 1971 | 248 | 0 | 248 | 49600 | 27974.4 |
| 1972 | 252 | 0 | 252 | 50400 | 25855.2 |
| 1973 | 257 | 0* | 257 | 51400 | 24003.8 |
| 1974 | 262 | 0* | 262 | 52400 | 22217.6 |
| 1975 | 266 | 0 | 266 | 53200 | 20535.2 |
| Totals | 2661 | 0 | 2661 | 532200 | 338704.2 |

* Unconfirmed outbreaks recorded. Anon (1974b). The details of the outbreaks are not available.

Table 20 The number of Veterinarians in Ghana from 1964 to 1971

| Year (X) | Number of Veterinarians (Y) |
|---|---|
| 64 | 10 |
| 65 | 10 |
| 66 | 12 |
| 67 | 12 |
| 68 | 13 |
| 69 | 15 |
| 70 | 16 |
| 71 | 17 |

Table 21 The expected number of Veterinarians without the J.P-15 campaign *

| Year | Expected Number of Veterinarians |
|---|---|
| 72 | 18 |
| 73 | 19 |
| 74 | 20 |
| 75 | 21 |
| 76 | 22 |

* Calculated from the equation $Y = 1.06X - 58.39$ .... (2)

Table 22 The number of Veterinarians after the institution of the J.P-15 campaign.

| Year (X) | Number of Veterinarians (Y) |
|---|---|
| 71 | 17 |
| 72 | 30 |
| 73 | 34 |
| 74 | 37 |
| 75 | 47 |
| 76 | 51 |

The increase in the number of Veterinarians together with the knowledge acquired during the J.P-15 campaign, have stimulated a chain of useful developments in the Department of Veterinary Services. New management techniques acquired from the J.P-15 campaign were significant and placed the Department in its own distinct and highly respectable class.

An association of professional Veterinarians has now been formed in Ghana, because the number of Veterinarians in the country now exceeds 50; the number required by the Government of Ghana to permit the formation of such an association.

The correlation coefficient of the number of Veterinarians on the years, with J.P-15 is + 0.872 (Table 22). This is significant and gives some confidence in predicting what the number of Veterinarians would be in the future. The number of Veterinarians can thus be predicted to be 78 and 206 in 1980 and 2000 respectively.

Intrinsic benefits: Social gains from the J.P-15 campaign cannot be under estimated, even though such gains are not quantifiable. Almost every function in Northern Ghana involves cattle either as live animals or slaughtered. Bride prices and local court fines usually involve live animals whilst festive celebrations and funeral obseques are marked with slaughtered cattle. The celebration of such functions have invariably improved with the increase in the cattle population.

Residual value of capital investments: Some of the capital investments made in the course of the J.P-15 campaign had residual values at the end of the campaign and must be set against costs or added to the benefits. Such items included vehicles, refrigerators, ice-making machines, deep freezers and ear clippers, which were in use after the J.P-15 campaign. Some of the vehicles are still roadworthy. Unfortunately the values of the items are not available and therefore no fixed amounts can be depreciated and credited as benefits to the J.P-15. It should be noted, however, that the services received from these items after J.P-15 campaign have been valuable.

Cost of the J.P-15 Campaign: Ghana's financial contribution to the campaign was the amount utilised annually to control the disease before the campaign (Lepissier, 1971). The amount was ₵195,000.00 and the same amount was to be used annually as a follow-up in the post-campaign prophylaxis.

The actual cost of the campaign was the amount obtained from foreign aid which in Ghana totalled ₵157,005.00 (Table 3). The cost of J.P-15 vaccination was 14 cents, which was extremely cheap compared with the pre-J.P-15 cost per vaccination. For example, in 1955, when the highest percentage of the cattle population was vaccinated (Table 2), the cost per vaccination was 75 cents. An amount of ₵195,000 was used that year to control rinderpest and 147829 cattle were vaccinated.

The foreign aid was not utilised in the first year of the campaign alone but over the three vaccinal years. An amount of ₵52325.00 was utilised each year which is based on the assumption that one-third of the total amount was used in each of the three vaccinal years. The amount utilised in the second and third years should therefore be discounted to the first year to give the real cost of the J.P-15 campaign. The cost of the J.P-15 campaing was ₵143136.2 in Ghana (Table 23).

A benefit and cost ratio of $\frac{338704.2}{143136.2} = 2.4$ can be calculated for the J.P-15. A net profit of ₵195568.00 was obtained from the avoided mortality alone during the first ten years of the J.P-15 campaign.

The project can thus be accepted as being economically viable when the financial benefit is added to other benefits which cannot be quantified.

Table 23 The discounted cost of J.P-15

| Year | 1964/65 | 1965/66 | 1966/67 | Total |
|---|---|---|---|---|
| Foreign Aid ($) | 52335 | 52335 | 52335 | 157005 |
| Foreign Aid discounted at 10% | 52335 | 47572.5 | 43228.7 | 143136.2 |

The discounted cost of J.P-15 was $ 143,136.2

CONCLUSION

The original meeting held in Kano in 1960 recommended eradication of rinderpest. The J.P-15 campaign, however, was not aimed at eradicating the disease but was an attempt to control the disease in West and Central Africa within the three vaccinal years.

The three years of active vaccination alone were inadequate to effect eradication of the disease in the zone, because of the numerous problems usually described as "African factors". Most prominent of these problems were the poor husbandry and communication systems and above all the fact that 100 per cent immunity cannot be attained in a given cattle population; there always being a susceptible group of unvaccinated yearlings.

The incidence of the disease had gone down at the end of the J.P-15 campaign and complete eradication only required persistent adherence to the post-campaign prophylaxis. It could not, however, be undertaken adequately in some of the States because of various reasons of which the most important were lack of funds and political unrest.

Ghana, on the other hand, adhered strictly to the post-campaign prophylaxis and maintained a rinderpest free status for almost a decade, for the first time after the virgin epizootics in 1916. The status quo of rinderpest in Ghana and some of the West and Central African States was rightly compared by Dr. H.E. Lepissier, the International Co-ordinator, to the foot-and-mouth disease situation in Europe. The initial epizootics presented

the dreadful "face" of the disease and was followed by partial control measures which kept it in check but was not enough to eradicate it.

The J.P-15 campaign was a success in Ghana. Several benefits accrued out of the campaign and these included the knowledge gained, new management techniques, increase in the staff and most important, the decrease in the incidence of the disease with a subsequent contribution to the rapid increase in the cattle population. In addition, a financial benefit which doubled the cost of the project was attained at the end of the first decade after the institution of the J.P-15 campaign.

Experience gained from the J.P-15 campaign clearly indicates the need for "Provision of enough funds towards the maintenance of prophylactic measures after the active phase of the project in all States involved". Rinderpest might have been eradicated from Central and West Africa by now if adequate funds had been allocated towards the post-campaign prophylaxis.

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