LIVESTOCK RESEARCH AND DEVELOPMENT IN NIGERIA — A REVIEW

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SUMMARY

Research has in the past few decades achieved praise, but has not made the desired impact on livestock production on account of varieties of problems and of partial neglect of livestock subsector during the successive National Development Plans of the country. The paper takes an account of these problems, progress made so far and suggests ways and means of improving livestock production through innovative research and development.

INTRODUCTION

Recent statistics show that human population in Nigeria has increased from 66.365 million in 1971 to 75 million in 1980 (FAO, 1980). The continuous population growth, the accompanying accelerated urban migration of rural population, the rise in living standards and the failure of food production to keep pace with population growth have brought about enormous increases in food demand and a steep rise in food prices to the extent that Nigeria in recent

years has become a net importer of food (Table 1). Today, with the current food demand growth rate of 3.6% per annum and production growth rate of 1%; about 2.6 million tons of grain equivalent are being imported annually (Anon, 1981). If the demand and production growth rates remain the same over the plan period (1981 — 1985), a deficit of 5.5 million tons of grain equivalent would be expected by 1985.

Despite vast natural resources available in the country, lack of mobilisation has forced governments to resort to massive importation of food items from overseas. Considerations as regards livestock development are not purely economical but are also related to national food supply. Therefore this paper discusses the problems facing livestock industry in Nigeria; examines contributions made by research and other government oriented programmes, and suggests ways and means of further improvements.

TABLE I
Average Prices of Some Selected Livestock Products in Nigeria (Naira per Kilogram)

Location	Beef			Mutton			Goat-Meat			Pork		
	1977	1978	1979	1977	1978	1979	1977	1978	1979	1977	1978	1979
Enugu	3.44	3.50	4.00	3.09	3.18	3.70	3.29	3.30	3.80	3.29	3.56	4.03
Calabar	3.50	4.79	3.90	2.58	2.45	—	3.42	4.17	3.90	3.38	4.34	3.75
Port-Harcourt	2.88	4.30	6.31	3.00	3.88	5.58	3.18	3.95	5.50	2.43	3.50	6.88
Benin City	2.69	2.85	3.24	1.60	1.70	2.07	2.44	2.35	2.39	2.53	2.63	2.97
Ibadan	2.18	2.77	2.81	2.65	—	—	—	—	—	1.96	2.10	3.48
Lagos	2.75	3.74	3.78	1.82	2.93	3.58	—	—	—	2.17	3.00	3.65
Ilorin	3.88	1.87	4.63	—	1.95	—	2.23	1.65	2.70	—	—	—
Jos	2.83	3.00	3.63	2.75	2.00	2.13	2.00	2.00	2.12	3.68	2.70	3.38
Kaduna	2.25	2.58	2.43	2.409	1.93	1.90	2.31	1.93	1.80	—	—	—
Kano	2.20	2.20	2.88	2.04	2.03	2.40	2.20	1.95	2.55	—	—	—
Maiduguri	1.88	2.25	2.68	1.66	2.15	2.43	1.61	2.57	2.13	—	—	—
Sokoto	3.75	3.41	3.24	2.83	2.64	2.61	2.23	2.08	2.00	—	—	—

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Source: NLMA/FLD Quarterly Reports and Federal Office of Statistics Market Surveys

1. PRESENT STATUS

The present estimates of livestock population shows that in 1980 Nigeria has 12.3 million cattle, 11.7 million sheep, 24.0 million goats, 1.1 million pigs, 0.017 million camels, 0.25 million horses and 120 million poultry (FAO 1980; see also Table 2). The FAO figure for poultry appears to be moderately low when compared with the estimated figure of 181.3 million by Akinwumi *et al* (1979). This emphasizes the need to have accurate

livestock figures in this country. Table 3 gives estimated figures for livestock products (FAO 1978). When these figures are viewed against the estimated population of 75 million in 1978, it indicates that local livestock production can meet less than 20% of the demand and imports are therefore inevitable to make for the deficit. And the demand for these will become greater in the years ahead with the estimated population growth rate of 3% per annum (Oyenuga, 1972).

TABLE 2
Nigeria Livestock Numbers 1 (1974 — 1980) (x1000)

	1974	1975	1976	1977	1978	1979	1980
Cattle	10,918	11,000	11,300	11,500	11,565	12,000	12,300
Sheep	7,545	7,650	7,900	8,100	8,254	8,500	11,700
Goats	22,390	22,500	23,000	23,000	24,188	24,500	24,000
Pigs	865	880	900	950	973	1,100	1,100
Horses	248	250	250	250	262	250	250
Camels	18	18	17	17	18	17	17
Asses	710	720	700	700	700	700	700
Poultry	81,000	85,000	900,000	95,000	97,210	110,000	120,000

(Sources: F.A.O. Production Yearbook 1978 and Animal Health Year Book 1979 and 1980)

TABLE 3
Nigeria Livestock Products (x100) (Metric Tonnes)
(1974 — 78)

	1974	1975	1976	1977	1978
Poultry Meat	52.0	59.0	90.0	100.0	102.0
Pig Meat	29.0	29.0	33.0	35.0	36.0
Goat Meat	63.0	68.0	79.0	77.0	80.0
Mutton	22.0	23.0	27.0	26.0	25.0
Beef	182.0	181.0	191.0	192.0	197.0
Eggs	102.1	107.1	124.7	136.8	139.8
Milk (Fresh)	284.0	297.0	316.0	316.0	324.0
Cattle Hides	33.0	31.4	31.1	32.0	32.8
Sheep Skins	4.9	4.9	5.1	5.2	5.3
Goat Skins	18.1	18.3	18.7	19.2	20.0

Sources: F.A.O. Production Yearbook 1976 and 1978.

2. PROBLEMS OF NIGERIAN LIVESTOCK DEVELOPMENT

Livestock industry in this country is beset with many problems and attention can only be directed to some of the more important ones. These are:-

- a) Scarcity of feeds .
- b) Lack of suitable breeds
- c) Out-dated husbandry techniques
- d) Weak extension services
- e) Lack of credit facilities and inadequate level of incentives.
- f) High prevalence of diseases
- g) Lack of reliable data base for national livestock planning
- h) Land tenure system
- i) Lack of qualified manpower

a) *Scarcity of Feed*

Livestock feed constitutes about 75-80% of the total recurrent cost in poultry and pig enterprises. Ademosun (1976) a and b reported that there had been 30 to 345 percent increases in the price of poultry feed ingredients as compared to prices five years ago. This high price has forced many small farmers out of the poultry business. To stem this trend, the government resorted to import of maize from U.S.A. and other countries with its attendant adverse effect on our foreign exchange earnings, and killing incentive for home production. The inability of feed millers to schedule importation of feed ingredients resulted in the under utilization of feed mill. Further, it became impossible to guarantee quality of feeds since most of these ingredients deteriorate before they are used for compounding feeds; this is apart from the deliberate adulteration of compounded feeds by some unscrupulous feed millers.

b) *Lack of suitable breeding stock*

Our local animals (cattle, sheep, goat, pig and poultry) are generally characterised by slow growth rate. The local chicken lay between 60 and 80 eggs per annum (Hill and Modebe, 1961) and the eggs are small (about 40 gm). By contrast the modern commercial hybrids are capable of producing 240-300 eggs of 58 gm each per bird per annum. The indigenous cattle have low heritability estimate indicating that this character could not be improved appreciably by individual selection. Various state governments realised this and resorted to importation of exotic breeds of dairy cattle and some beef breeds to upgrade our local herds. Even though the planning and execution of these breeding programmes have not been properly organised, their records offer the basis for future breeding work. The exotic day-old chicks are imported for egg and meat (broiler) production. The problems of these imports are irregular supplies of chicks, inability to choose good productive strains, introduction of exotic diseases and dependence on foreign countries for supply of breeding stock.

c) *Outdated management techniques*

Efficient management is key to successful operation. Today, increasing costs of feed ingredients call for the most efficient management possible. Under the prevailing conditions, our traditional livestock farmers particularly the Fulani herdsmen have done well as compared to the past but their methods of production need a lot of improvement for it to keep up with some of the increasing demand for beef and milk.

d) *Weak extension services*

There are many factors limiting the effectiveness of extension services in

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Nigeria. Williams (1981) listed some of these problems namely:—

(i) *Lack of qualified extension workers:*

Oranyelu (1981) defined the extension agent as "one who receives a new farming technology and passes it on to the farmers. He should be able to identify the problems of the farmer and pass them on to an appropriate research institution for a solution. To perform this duty he must be well trained and highly knowledgeable. He should be able to interpret research findings and must understand the farmer and his environment." Very few of these calibre of men exist in our extension services. Most of the qualified ones are now administrators at the head-quarter offices.

(ii) *Long channels of communication and long decision making process*

The channels of communication from the headquarters to the field and decision making process under civil service system in which extension services are operating take too long. As regards livestock activities which are time specific, delays are highly detrimental.

(iii) *Personnel motivation and management*

Most of the extension personnel appear to be frustrated with their jobs because of inadequate promotion prospects and lack of adequate inservice training provision. Many feel that once they are posted to rural areas they are forgotten.

(iv) *Lack of effective liaison system between the research institutes, the extension services and the farmers*

The major reason for this is lack of formal linkage between the research institutes and extension services responsible for passing information to the farmer.

(v) *Inadequacy of supportive facilities and lack of farm inputs*

Lack of transport facilities, essential audio-visual equipments and adequate office accommodations are perennial problems seriously undermining the efficiency of the extension service. A basic complaint of extension agents is that they are unable to get essential inputs to farmers they serve at the right time and at a reasonable cost. This tends to undermine the credibility of the extension agents with the farmers.

(e) *Lack of credit facilities and incentives:*

Credit and investment are important to growth of livestock industry, therefore farmers must have access to capital to farm and should be able to borrow it at a reasonable rate of interest. Incentives can come in many ways including increasing duties and tariffs to favour local production, helping farmers to store and market perishable livestock products like eggs, milk and meat and supply of inputs at highly subsidised rates.

(f) *High prevalence of diseases:*

Livestock production is still being hampered by diseases. The disease prevalence varies from one species of livestock to another. Diseases like

anthrax, foot and mouth disease, rinderpest, streptothricosis and contagious bovine pleuropneumonia (CBPP) in cattle; and peste des petits ruminants (PPR), heartwater in goats and sheep; Newcastle disease, Gumboro, coccidiosis, infectious bronchitis and chronic respiratory disease (CRD) in poultry, still cause a lot of concern to veterinarians. Other problems are shortage of vaccines due to inadequate funds, inadequate personnel to man veterinary centre post and lack of access to veterinary by a number of small scale farmers (Sansi, 1975).

(g) *Lack of reliable basic data for national livestock policy and planning*

For any effective planning, there must be baseline figures on which to plan. In Nigeria accurate figures of the various species of livestock are hard to come by just as those of human census. Figures estimated by organisations like, Food and Agriculture Organisation of the United Nations, International Livestock Centre for Africa, Federal Livestock Department of Nigeria and others vary widely. Inaccurate census figures for cattle had in the past been blamed on the cattle tax (Jangali) but it is now observed that even the literate poultry farmers show resentment of attempts to obtain census and production-cost data from them. These have posed some problems over developing meaningful pricing and subsidy policies for livestock production.

(h) *Land tenure system:*

Before the land use decree of 1978, control and management of land rested with individual families or communities. Traditionally, this,

communal ownership varies from area to area in Nigeria, but there are three main problems associated with communal system of ownership:-

- (i) The system inhibits individuals from investing and improving farm lands.
- (ii) Lack of clear title of land means the farmer's most important asset cannot be used as collateral for raising capital.
- (iii) By vesting the ultimate right of disposal with the community rather than with individual, efficient transactions and efficient use of land are hampered.

(i) *Lack of qualified manpower:*

The problem with our large scale livestock operators is that they man their units with poorly trained attendants who cause collapse of the entire business through improper management and pilfering.

3. *Role of Government in Livestock Production:*

The major role of the government in the livestock sector of the economy is two fold:-

- (i) Applied research.
- (ii) Government development oriented programmes.

Research organisations:

Research on the livestock activities are carried out by (1) the National Veterinary Research Institute, Vom, (2) the National Animal Production Research Institute, Shika, Zaria, (3) the Nigerian Institute of Trypanosomiasis Research, Kaduna, and (4) the Leather Research Institute of Nigeria, Zaria. In addition, there are three faculties of veterinary medicine and four departments of animal science at the universities of Ife, Ibadan, Nsukka and Zaria that are involved in livestock research.

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Management of Research Institutes:

Before 1975, the Agricultural Research Institutes were managed by governments (Federal and State) and universities. By Agricultural Research Institutes Decree of 1973, all such institutes came under the aegis of the Agricultural Research Council of Nigeria and by Decree No. 5 of 1977, they were administered by the National Science and Technology Development Agency (NSTDA). The Federal Ministry of Science and Technology was established by the National Assembly (the Science and Technology Act 1980) and it took over the functions of NSTDA. The major objective was to co-ordinate research activities and to avoid unnecessary duplication. There is no doubt that these frequent changes in the management of Research Institutes and their activities have their problems for research and in some cases these have been very severe.

Research funding:

Table 4 shows that for quite sometime

now research has never had its fair share of revenue allocations, despite the increases over the successive plan periods. The amount voted for research work is misleading because what actually goes for research is mixed up with votes meant for research staff emoluments. Another point is that what is actually released is a far cry from what is approved on paper. One would expect a better deal for livestock research with the creation of central co-ordinating body like NSTDA, and now the Federal Ministry of Science and Technology. Inadequate funding severely limits capabilities of livestock research owing to lack of equipment and inadequate infrastructure. Poor operating funds are further compounded by unfavourable conditions of service for research scientists. It is estimated that expenditure on research in developed countries averages 2—3% of the gross national product (GNP) but only 0.2% in developing countries. Research should be considered as an economic activity using scarce resources for maximum effect.

TABLE 4
Capital Outlay of National Development (In Naira)

Allocation Under	First Plan	Second Plan	Third Plan	Fourth Plan
1962—68	1970—74	1975—80	1981—85	
<i>Agriculture:</i>				
Federal	—	61,668,000	750,846,820	42,500,000,000
State	—	153,656,000	895,006,880	28,000,000,000
Total	29,984,000	215,656,000	1,645,853,700	70,500,000,000
Livestock				
Federal	—	6,276,000	170,869,560	958,630,000
State	—	42,632,000	173,176,631	950,000,000
Total	5,479,310	49,908,000	344,046,191	1,908,630,000
Livestock Research (NVRI, NAPRI, NITR, LRIN).	644,000	1,254,600	23,669,000	181,000,000*

*Note: Livestock Research was part of Federal Ministry of Economic Development, Ministry of Agriculture, NSTDA and lately Ministry of Science and Technology).

Government development oriented programmes:

Apart from funding research activities relating to the livestock sector, government is also involved with other programmes aimed at boosting livestock industry. Unfortunately, the Federal Government allocated meagre sums (Table 4) to the Livestock sector programme which broadly covers feed production, veterinary and health services, extension services, training and marketing facilities. The current growth rate for livestock industry is about 0.75% and the type of effort required to close the demand versus supply gap for livestock products calls for production growth rate of at least 11.25%. The state governments have parallel programmes on livestock development and there are some contributions from the private sector too. With this sort of meagre budgetary allocation to agriculture in general and livestock in particular, the desired transformation will remain an illusion.

4. RESEARCH CONTRIBUTION TO LIVESTOCK PRODUCTION

Research has played major role in three principal areas of livestock production namely animal nutrition, breeding and disease control.

(a) Animal nutrition

Efforts to solve the country's perennial feed problem have received multidisciplinary attention. Falusi (1974) has reviewed recent work on the improvement of grain yields through fertilizer application while Oluyemi and Akenova (1979) reviewed recent advances in improvement of grain yields and quality through plant breeding. Because of high price of conventional feed ingredients like maize and groundnut cake, there has been considerable interest in finding alternative energy and protein sources like cottonseed meal, brewers spent grains and cassava

meal as agro-industrial by-products. These have been found satisfactory to replace partially the more conventional sources (Njike, 1979a). However, owing to decline in crop production, prices of these by-products too are rising.

Feed requirements for livestock as recommended by the ARC or NRC are established in the temperate regions and may not be satisfactory in the tropics. While studying such requirements especially for poultry in the tropics (Babatunde and Fetuga 1976, Olomu 1976, Olomu and Offiong 1980, Njike 1979b 1981; Njike and Ndife 1980 a & b) efforts are being made to find replacements for imported ingredients (e.g. Sokoto limestone with low flourine content for poultry and total replacement of fishmeal by vegetable protein etc.) Similar research work is going on in the areas of cattle nutrition and pasture management (Akinola, 1976; Akenova, 1976; Akenova and Chheda, 1976).

(b) Animal breeding:

Experiments in animal breeding with a view to improve milk production started several decades ago and has achieved partial success. Cross breeding Friesian with Bunaji has been shown to increase milk production to twice that of pure Bunaji (Knudsen & Sohael, 1970). Similar experiments to cross Brown Swiss with Wadara failed miserably (Anon, 1976). In the recent past there have been increase in the number of dairy farms stocked with exotic breeds of cattle but still the milk production is far from reaching self sufficiency. Work on beef cattle has been limited but for an N'dama cattle herd-book record kept on the Fashola Livestock Farm was analysed by Adeyanju *et al* (1976). There are indications that birth weight, pre-weaning daily rate gain and weaning weight have significant sex, month, year and sire effects.

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As regards poultry, parent stock for egg production and for broilers are being imported and it is hoped that continuous importation of day-old chicks from overseas will cease in near future.

Pig breeding has recently been started and has a bright future in Nigeria as pigs like poultry are efficient converters of agro-industrial by-products.

Extensive work on sheep and goats have been carried out. Dettmers *et al* (1976a) studied the reproductive performance of West African Dwarf sheep. They observed that ewes on the average stopped gaining weight after they have attained the age of two years. The authors therefore recommended that sheep not retained as breeding stock should be slaughtered from an age of two years or less. In another study Dettmers *et al* (1976b) evaluated mutton production of West African Dwarf sheep in relation to age and sex of the animals. Their results indicate that young ewes were superior to young rams both in dressing percentage and primal cuts. Compared with mutton sheep of temperate zone, they found that West African sheep stand only 4/5 as high and are 2/3 as long while weighing only 1/4 to 1/3 that of European sheep but the leg cut is 1/3 of the dressed carcass as compared to European sheep. Orji *et al* (1976) analysed the herdbook of the breeding flock of the University of Ibadan for the period 1968 — 1974 and found that age of first lambing varied from 310 to 692 days, lambing interval, 151 — 571 days and number of lambs at birth, 1 — 3. The wide ranges in performance indicate that there are scopes for improvement of the reproductive potential of the West African Dwarf sheep through selection. The nutritional studies of Adegbola *et al* (1976) appear to indicate that protein requirements for maintenance of West African sheep is low as compared to its European counterpart showing adaptation of the dwarf sheep for survival under inadequate dietary protein supply. Results

of three experiments carried out by Job *et al* (1976) indicate that dried cassava, cassava ensiled with poultry litter or unpeeled fresh cassava tubers can replace all the maize in the diet of growing sheep.

In a series of nutritional studies (Mba *et al* 1974, Akinsoyinu *et al* 1975 a & b) in which urea-based ration and groundnut cake based ration as supplements to giant star grass in dietary of West African Dwarf sheep were compared, it was found that:

- (i) the liveweight gains of goats on urea-based ration were higher than those on groundnut cake.
- (ii) the two sources of nitrogen had no effect on dressing percentage, the major cuts such as loins, thigh and shoulders or the protein contents of the organs and muscles and
- (iii) maximum growth rate and nitrogen balance in urea-based diet required 0.3% methionine supplementation.

In a survey on reproduction losses in female goats in two divisions of Oyo State, Falade and Sellers (1976) showed that abortion, stillbirth, dystockia and perinatal death accounted for reproductive losses in goats.

Disease control:

The role of animal health in animal production is very vital because diseases reduce productive potentiality of animals and birds. "Animal plagues" like rinderpest of cattle or Newcastle disease of poultry are feared for their devastating effect but there are others like trypanosomiasis, anaplasmosis or helminthiasis whose effect on animal production cannot be underestimated (Taylor, 1975 Attang). Further, in this country there are over 200 other diseases of animals which are of public health significance of which

rabies, tuberculosis, brucellosis and salmonellosis are most important (Mohammed, 1977).

NVRI experience in disease research and vaccine production

National Veterinary Research Institute, (NVRI) Vom, is actively engaged in research with a view to developing newer techniques of diagnosis and more effective immunising agents for prevention and control of economically important diseases. For control and eradication of any disease accurate diagnosis and surveys are highly essential. NVRI has been actively engaged in carrying out laboratory diagnosis at its headquarters at Vom as well as at substations in many state capitals. During the past decade serological surveys were carried out against major infectious diseases of livestock of economic importance (Nawathe and Lamorde, 1980).

Rinderpest

Rinderpest panzootic which swept 90% of the cattle population in West Africa a decade before the turn of this century was the most feared enemy of cattle. The normal control measures of segregation and quarantine were ineffective because of transhumance nomadism being traditional form of husbandry coupled with north-south movement of trade cattle originating from the neighbouring countries. Lack of communication, transport and trained manpower were other constraints in controlling the disease (Rwayemamu, 1980).

Anti-rinderpest serum was the first biological to be produced at Vom and it was soon followed by the production of formalised spleen suspension for active immunisation. Both these products were extensively used in the annual vaccination camps despite difficulties in their transport and storage in the field and the

short duration of immunity they offered the animal against the disease. In the year 1942 goat adapted rinderpest vaccine was developed and in the following year quality of the vaccine was further improved by lyophilisation in the Cryochem machine. The vaccine afforded solid protection in the zebu cattle for several years and was used in the field for 20 years. For the highly susceptible humpless cattle of N'dama, Muturu, Keteku and exotic beef and dairy cattle, a milder vaccine was prepared in rabbits. Both these vaccines were eventually replaced by more highly effective tissue culture rinderpest vaccine (TCRV) which was extensively used in the later phases of international Anti-Rinderpest Campaign Joint Project 15 (JP 15) in West Africa. It was developed at Vom (Sansi, 1975) and not only used in the country but exported to other West African countries as well. During the campaign alone (1962-65), 22 million doses of rinderpest vaccines were used of which 7 million were TCRV. Since then, 5 million doses of TCRV have been issued annually to the field for the follow-up programme. Periodic monitoring of immunity in the national herd against rinderpest is undertaken by the Institute by employing serum neutralisation test in cell culture.

Fig 1 shows the effect of vaccination (JP 15) campaign on the incidence of rinderpest in Nigeria. There was a drop from 200 to 400 outbreaks to 2 to 3 outbreaks a year. The number rose with the slackness of follow-up programme during the civil war and subsequent reorganisation of veterinary services. The country has been free from rinderpest since 1974 although sporadic outbreaks continue to occur in the neighbouring countries (Fig 2). However, from 1980 to date suspected outbreaks continue to occur in Sokoto State but they are promptly controlled. Felton and Ellis (1978), calculated benefits of rinderpest control

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in Nigeria to the tune of 10% cattle production per year and the reduction of direct and indirect mortality and reduced

reproductivity; or a saving in terms of money it could be about 15 million Naira per year.

Fig. 1. : Impact of vaccination campaign (J.P.15) on the incidence of rinderpest in Nigeria.

Fig. 1: Impact of vaccination campaign (JP 15) on the incidence of Rinderpest in Nigeria.

Fig. 2: Situation of Rinderpest in 1980

- Zone 1: Countries free since 1903
- Zone 2: Free over a decade
- Zone 3: Free in recent years
- Zone 4: Sporadic disease still prevalent

TCRV has also been found to be equally effective for "Kata" or Peste des petits ruminants (PPR) of sheep and goats in West Africa. The International Workshop on PPR held at Ibadan in September, 1980 considered PPR as of increasing economic importance and urged systematic vaccination with TCRV for its prevention. There are over 33 million sheep and goats in the country to be protected against PPR. The Institute has therefore increasing responsibility to produce TCRV in adequate quantity to meet this challenge almost immediately.

Contagious bovine pleuropneumonia

Another important disease against which international vaccination campaign is in progress is Joint Project 28 aimed against eradication of contagious bovine pleuropneumonia (CBPP) in the tropical Africa. The Institute has been producing CBPP vaccine for the past 50 years but there have been innovations in the technique, for preparation of vaccine strain of organism and medium used to improve effectiveness of vaccine as well as to allow for increased mass production. The original "KH₃J" strain offered protec-

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Contagious bovine pleuropneumonia

Another important disease against which international vaccination campaign is in progress is Joint Project 28 aimed against eradication of contagious bovine pleuropneumonia (CBPP) in the tropical Africa. The Institute has been producing CBPP vaccine for the past 50 years but there have been innovations in the technique, for preparation of vaccine strain of organism and medium used to improve effectiveness of vaccine as well as to allow for increased mass production. The original "KH₃J" strain offered protection for a few months only hence it was replaced by stronger "T₁" strain in 1973. Lyophilisation of vaccine further increased its keeping quality. Over ten million doses of CBPP vaccine are being supplied for the P 28 campaign annually. The effect of vaccination campaign is summarised in Fig. 3. The scourge is now confined to relatively small foci which are becoming fewer annually.

Fig. Effect of vaccination campaign against Contagious Bovine Pleuro-Pneumonia in Nigeria. Declining outbreaks (continuous line) indicate the success of vaccination (dotted line).

Fig. 3: Effect of vaccination campaign (JP 28) against Contagious Bovine Pleuro-Pneumonia in Nigeria.

Some states in the Federation follow "slaughter and compensation policy" for CBPP control and eradication, while others follow ring vaccination and voluntary slaughter of the affected ones. It is difficult to pick up "lungers" by clinical examination but it is possible by serological test though the test is not infallible. In order to provide for quick diagnosis the Institute has developed gel precipitation, complement fixation and allergic skin tests. Mobile laboratories equipped to carry out these tests on the spot in the field, undertake field trips whenever called upon.

Black Quarter, Anthrax and Haemorrhagic Septicaemia

Likewise, vaccines for prevention of Black quarter, Anthrax and Haemorrhagic Septicaemia in cattle have been in high demand among the cattle herdmen. These vaccines have been produced for over 45 years at Vom with only few modifications in the techniques of production and potency testing.

Rabies

Attempts were made to produce Semple type anti-rabies vaccine during the years 1935-40. Unfortunately the results from the field were disappointing and the production was suspended until 1956 when the present avianised Flury strain was employed. There were problems of lyophilisation and potency testing in guinea pigs but they were solved by centrifugation of the vaccine before lyophilisation and use of highly potent challenge virus for potency tests. There are constraints in increasing production of this canine rabies vaccine, over the present 100,000 doses per year level using the present techniques. Hence a tissue culture rabies vaccine has been developed and is presently undergoing safety testing in puppies.

For cats, cattle and horses a milder vaccine which has undergone further 150 egg passages was developed in 1971. Between

10,000 to 20,000 doses of this vaccine are produced annually.

Rabies being a disease of public health importance, priority is given in despatch of vaccines for the control of outbreaks. Recently country-wide rabies vaccination campaign has been launched and the Institute is committed to provide vaccines, diagnostic facilities and necessary training of staff in diagnosis etc. to meet demands of the campaign.

Fowlpox disease

Pigeon pox vaccine for fowlpox was the first poultry vaccine to be developed at Vom in 1948. It was produced by scarification of pigeon breast and later by inoculation of chorioallantoic membrane of the developing chick embryo. The pigeon pox vaccine offered immunity of short duration hence it was replaced by stronger fowlpox virus in 1964 and keeping quality further improved by lyophilisation.

Newcastle disease

Newcastle disease is still the greatest scourge of poultry in Nigeria. It has been spread by free roaming village chicken and ducks. Characterisation of the representative isolates of the virus have shown that they are of highly virulent type. The disease was diagnosed for the first time in Nigeria by virus isolation at Vom in 1952. The Komorov strain of vaccine was developed in 1960. It was suitable for growers and adults but it often caused recrudescence in baby chicks, for which B1 vaccine was developed for administration by intraocular route in 1963. Maternal antibody affects the immunisation of baby chicks hence a little stronger vaccine using Lasota strain was developed in 1968. It has very high spreading potential when given by non-parenteral route especially via drinking water. Administration of Lasota vaccine at least 3-4 weeks before injecting Komorov has been found to be useful in curbing vaccine recrudescence.

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Gumboro disease

Gumboro disease was introduced into Nigeria in 1969 along with the import of day-old chicks from overseas. Today it is responsible from 5 to 30% mortality among the growers. The symptoms of Gumboro disease overlap those of

Newcastle disease but a gel precipitation test can easily diagnose Gumboro in 24 hours. A cell culture vaccine employing imported vaccine strain was developed by the Institute in 1979 and is now approved for field use.

Fig. Production of both Bacterial and Viral Vaccines at NVRI, Vom, Nigeria since its inception in 1925.

Fig. 4: Production of both Bacterial and Viral Vaccines at NVRI, Vom, Nigeria since its inception in 1925.

FUTURE PROSPECTS AND RECOMMENDATIONS

On paper, the Federal and State Governments have laudable livestock policies. This country is also highly favoured with rich natural and manpower resources and therefore the country has the potentials to be self sufficient in agriculture in general and livestock in particular. Research prospects in agriculture and livestock production are good and would give dividends in multiples of investment which are being founded on cost-benefit relationship, provided that the government provide the necessary supports and inputs.

Recommendations:

1. Accurate livestock records

To achieve this, a National Agricultural Census Board should be established with its branches in all the local government areas with sole mandate of compiling agriculture and livestock figures etc. which will form the basis for national policy on livestock research and production. At present such records are based purely on assumptions and estimates.

2. Integrated research approach

To establish the limiting factors in the area of animal production, close collaboration is essential between the different specialists ranging from breeders,

nutritionists, veterinarians, biochemists, animal husbandry-men, extension workers to economists. Interdisciplinary activity is necessary to stimulate an intense awareness of all aspects of the problem. To achieve this, in addition to single commodity research institutes (NIFOR, Rubber, Root Crops etc.), it is necessary to establish a multipurpose research institutes with diversified interests located in some strategic zones of the country in which all aspects of problem are dealt with by the specialists working in consonance.

3. Research funding

Funding of Research Institutes by the Federal Government is grossly inadequate and erratic. Many a times approved research programmes do not take-off and those that do, are often grounded due to drastic budget-cuts. For example, National Veterinary Research Institute, could not meet the demand for the much needed poultry vaccines for want of facilities for expansion (Sansi, 1979). To supplement government research efforts, it is suggested that the private section should be made to contribute towards research particularly in their various production activities as it is done in most developed countries.

Similarly, more funds are needed to modernise currently established research libraries so as to obtain and maintain up to date scientific information which is a prerequisite for innovative research.

4. Conditions of service

The conditions of service for research workers, which at present are in line with Udoji unified civil service scheme do not encourage suitably qualified research scientists to take up appointment with Research Institutes. The experienced ones migrate to other sectors (both private and public) where conditions of service are relatively better. Better conditions of service surely will make for more permanency and continuity of research scientists.

In the recent past several distinguished Nigerians were given "National Awards" for their various contributions to the nation's socio-economic activities. This should also be extended to the distinguished scientists for their outstanding contributions in the field of research. This annual omission is a clear reflection of the importance the nation attaches to research scientists.

5. Feed shortage

Currently, the country is facing a severe problem of feed shortage. The government financial guidelines on loans to farmers appear attractive but difficult to implement. There is no way the small scale farmers can provide the collaterals being demanded for by the banks. To solve this, all possible encouragements should be given to the farmers by way of soft loans, grants, subsidies and other incentives in order to produce the food and the raw materials to meet the country's needs. Basic research into novel protein sources for livestock feed e.g. single cell hydrocarbons, aquatic algae and petroleum bacteria should also be encouraged.

REFERENCES

- ADEGBOLA T.A., MBA A.U., and OLUBAJO F.O. (1976) Endogenous losses of nitrogen and protein requirement for maintenance of sheep Nig. J. Anim. Prod. 3: (2) 156 — 162.
- ADEMOSUN, A. (1976a). The livestock Sub-sector National Development Plan Nig. J. Anim. Prod. 3: 10—17.
- ADEMOSUN, A.A. (1976b). Livestock production in Nigeria, our omissions and commissions. Inaugural Lecture series 17, University of Ife
- AKENOVA, M.E. and CHHEDA, H.R. (1976). Beef production on rotationally grazed F₁ *Pennisetum* hybrid and elephant grass (*Pennisetum purpureum schum*) pasture Nig. N. Anim. Prod. 3: (2) 20-24.
- AKINOLA, J.O. (1976). Influence of spacing on performance of elephant grass (*Pennisetum*

LIVESTOCK RESEARCH IN NIGERIA.

- purpureum schum*) during the year of establishment in the Northern Guinea Savannah of Nigeria. Nig. J. Anim. Prod. 3: (2) 172-180.
- AKENOVA, M.E. (1976). Forage potential of photoperiod sensitive millet (*Pennisetum Americanum* Linn., K. Schum.) in South Western Nigerian Nig. J. Anim. Prod. 3: (2) 13-19.
- AKENOVA, M.E. and CHHEDA, H.R. (1976). Beef production on rotationally grazed F₁ *Pennisetum* hybrid and elephant grass (*Pennisetum purpureum schum*) pasture Nig. N. Anim. Prod. 3: (2) 20-24.
- AKINSOYINU A.O., MBA A.U. and OLUBAJO F.O. (1975a) Studies on comparative utilization of urea and groundnut cake rations by young growing West African Dwarf goats II: Effect on carcass quality and chemical composition of the organs and muscles. Nig. J. Anim. Prod. 2: (1) 81-88.
- AKINSOYINU A.O., MBA, A.U., and OLUBAJO F.O. (1975b) DL-methionine supplementation effects on urea nitrogen utilization by growing West African Dwarf goats. Nig. J. Anim. Prod. 2: (1), 64.
- AKINWUMI, J.A., ADEYEYE, A.J., IKPI, A.E. and OLAYIDE, S.O. (1979). Economic analysis of the Nigerian Poultry Industry. A study commissioned by the Federal Livestock Department Lagos. Federal Ministry of Agriculture Water Resources Report.
- ANON. (1976). In Annual Report of the Federal Department of Vet. Res. Vom for 1974-75.
- ANON. (1981). In "Outline of Fourth Development Plan 1981 — 1982." Published by Federal Ministry of Planning Lagos. p.19.
- ATANG, P.G. (1975). Compulsory notification of diseases in African. IBAR Publication 8/24 dated 8/9/75.
- BABATUNDE G.M. and FETUGA B.L. (1976). Determination of the minimum crude protein requirements of broiler starters and finishers in the tropics. Nig. J. Anim. Prod. 3: (1) 126—138.
- DETMERS, A., IOOCHE C.A. and AKINKOLIE, K. (1976a). The West African Dwarf sheep¹. Reproductive performance and growth. Nig. J. Anim. Prod. 3: (1), 139—147.
- DETMERS, A., LOSSLI, J.K., TAIWO, B.B.A. and NKEMEATU, J.A., (1976b). The West African Dwarf sheep II. Carcass traits, mutton quality. Nig. J. Anim. Prod. 3: (2): 25—33.
- FALADE S. and SELLERS, K.C. (1976) Reproductive losses in female goats. Nig. J. Anim. Prod. 3: (2) 131 — 133.
- F.A.O. (1978). Food and Agriculture Organisation Production Year-book, Vol. 32, F.A.O. Rome.
- F.A.O (1980). FAO-WHO-OIE Animal Health Yearbooks — 1979 and 80 FAO. Rome.
- FELTON, M.R. and ELLIS, P.R. (1978). Studies on the control of Rinderpest in Nigeria University of Reading U.K. Study No. 23/1978 ISBN 0704902400 Price £2.50.
- HILL, D.H. and MODEBE, A.N.A. (1961) Poultry Production at University College Ibadan (1950-58) Tech. Bull. 2 FAR Agric. U.C. Ibadan.
- KNUDSEN, P.B. and SOHAEL, A.S. (1970). The Vom Herd: A study of the performance of a mixed Friesian/Zebu Herd in a Tropical Environment. Trop. Agric. Trin. 47: (3) 189—203.
- MOHAMMED, A.N. (1977). Relevance of Veterinary Research to Nigeria Health Services. Paper given at the Nigerian Society for Microbiology Conference at Vom on 3rd November, 1977.
- NAWATHE, D.R. and LAMORDE, A.G. (1980). Impact of viral diseases on Nigerian Livestock economy. Paper given at II Int. Conf. on Impact of Viral Diseases in African and Middle East Countries. Nairobi, December 1 — 6, 1980.
- NJIKE, M.C. (1979a). Alternative energy and protein sources for poultry feeds in Nigeria. "Poultry Production in Nigeria." Proceedings of the 1st National Seminar on Poultry Production held at Ahmadu Bello University, Zaria, December 11th — 13th 1979
- NJIKE, M.C. (1979b). Crude protein requirements of growing chickens under Nigerian environment. Nig. J. Anim. Prod. 6 (1&2): 52—58.
- NJIKE, M.C. (1981a). Crude protein requirements of growing chickens under Nigerian environment. Nig. J. Anim. Prod. 8(2): 75—83.

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- NJIKE, M.C. and NDIFE L.I. (1980a). Protein and energy requirements of broiler chickens in the tropics Nig. J. Anim. Prod. 7: (1&2): In press.
- NJIKE, M.C. and NDIFE L.I. (1982b). Response to methionine supplementation of broiler chicks fed practical corn-groundnut meal diets in the tropics. Nig. J. Anim. Prod. 7 (1&2) In Press.
- OLOMU, J.M. (1976). Determination of optimum protein and energy requirements for broiler chicks in the tropics. Nig. J. Anim. Prod. 3 (1) 177—183.
- OLOMU, J.M. and OFFIONG, S.A. (1980). The effects of different protein and energy levels and time of change from starter to finisher ration on the performance of broiler chickens in the tropics. Poult. Sci. 59: 828 — 835.
- OLUYEMI, J.A. and AKENOVA, M.E. (1979). The place of maize production in Nigerian Livestock Industry (National Cereal Research Institute Seminar Paper).
- ORANYELU, C. O. (1981). The role and effectiveness of extension agents. Paper given at Workshop on Utilisation of Agriculture Research Results. Organised by National Institute, Kuru, July, 1st — 3rd 1981.
- ORJI, B.I., STEINBACH T., OLALOKU E.A. and ADELEYE I.O.A. (1979). The reproductive performance of the Nigerian Dwarf sheep. Nig. J. Anim. Prod. 3: (2) 124 — 130.
- RWAYEMANU, M.M. (1980). Geographical and Sociological Factors in the Surveillance and control of Virus Diseases in Africa. Paper given at the II International Conference on the Impact of Viral Diseases. Nairobi, 1—6 December, 1980.
- SANSI, K.A.O. (1975). Improvement in Animal Production — Animal Health. Nig. J. Anim. Prod. 2: (1) 44-49.
- SANSI, K.A.O. (1979). Contribution of Veterinary Research in Livestock Production. Paper given at NVMA Conference held at Owerri 1979.
- TAYLOR, J.I. (1959). Animal Disease and Animal Health in Africa. J. West. Afr. Sci. Asso. 5: 126 — 132.
- WILLIAMS, S.K.T. (1981). Structures and Organisation of Agricultural Extension Services in Nigeria. A paper given at a Workshop on "Utilisation of Agricultural Research Results" Organised by National Institute, Kuru, July, 1st 3rd 1981.