E.C. No. 422

ESTIMATES COMMITTEE (1964-65)

EIGHTY-FIRST REPORT

(THIRD LOK SABHA)

MINISTRY OF FOOD AND AGRICULTURE

(Department of Agriculture)

NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL
AND
INDIAN VETERINARY RESEARCH INSTITUTE,
IZATNAGAR

LOK SABHA SECRETARIAT
NEW DELHI
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*Elected w.e.f. 18th September, 1964, *vice* Shri Lalit Sen ceased to be a member of the Committee on his appointment as a Parliamentary Secretary.

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INTRODUCTION

I, the Chairman, Estimates Committee having been authorised by the Committee to submit the Report on their behalf, present this Eighty-First Report on the Ministry of Food and Agriculture (Department of Agriculture)—National Dairy Research Institute, Karnal and Indian Veterinary Research Institute, Izatnagar.

2. It would be recalled that 11 years back, the Estimates Committee (1953-54) had examined the estimates of the Ministry of Food and Agriculture and presented the Tenth Report (September, 1954) which *inter alia* dealt with Cattle-*cum*-Dairy Farm Karnal and Indian Dairy Research Institute, Bangalore. Action taken by Government on the recommendations contained in the above Report was examined by the Estimates Committee (1956-57) who presented the Fifty-Eighth Report on the subject.

3. The Committee took evidence of the representatives of the Ministry of Food and Agriculture (Department of Agriculture) on the 3rd and 4th December, 1964. The Committee wish to express their thanks to the Secretary, Ministry of Food and Agriculture (Department of Agriculture), Director, National Dairy Research Institute, Director, Indian Veterinary Research Institute, and other officers of the Ministry and the Institutes for placing before them the material and information they wanted in connection with the examination of the estimates.

3. The Committee also wish to express their thanks to Prof. James N. Warner, Head, Department of Dairy Technology, Allahabad Agricultural Institute, Allahabad for giving evidence and making valuable suggestions to the Committee.

4. The part of the Report, relating to National Dairy Research Institute, Karnal was considered and adopted by the Committee on the 27th March, 1965 and the part relating to the Indian Veterinary Research Institute was considered and adopted by the Committee on the 21st April, 1965.

5. A statement showing the analysis of recommendations contained in the Report is also appended to the Report (Appendix VIII).

ARUN CHANDRA GUHA,
Chairman,
Estimates Committee.

NEW DELHI;
April 23, 1965.

Vaisakha 3, 1887 (*Saka*).

NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL

CHAPTER I—INTRODUCTORY

Agriculture and animal husbandry began to be developed in India from pre-Vedic times. The famous Cow-*Sukta* indicates that the cow had already become the very basis of rural economy and was held in high esteem. In ancient India cattle tending was one of the items of *varta* or pursuits suitable for making fortune.

In the Agnipurana the king enjoined to preserve the breed of cattle in the country. Brahmanical bulls were inviolable and were objects of special attention on certain festive occasions. The breeding bull has been described in the Matsya-purana as follows:

> "The bull must have elevated shoulders and humps, a soft and straight tail, tender cheeks, broad back, shining eyes, sharp horns, thick hair on the tail and eighteen nice teeth. The bull must be well-built, bellowing like the thunder clouds, high in stature and walking like an infuriated elephant."

The ancients were very particular as to the physical fitness of breeding bulls which were the public property. The feeding of the breeding bulls received the highest consideration.

India was the land where our ancestors conceived the idea of the famous "Kamdhenu" cow which produced according to desire. In ancient India, much attention was given to milch and plough cattle. Somehow the link with ancient culture was lost and the degradation followed, which may be attributed to general deterioration of rural economy.

A. Dairy Research—Historical Background

2. The growth of dairying in India on an organised basis is a comparatively recent development. On the recommendation of the Imperial Dairy Expert and the Inchcape Committee (1923), one of the Military Farms in Bangalore was converted into a Dairy Research Institute in 1923. The Institute was known as the "Imperial Institute of Animal Husbandry and Dairying".

In 1937, the then Government of India invited Dr. N. C. Wright, Director of Hannah Dairy Research Institute, Ayr, Scotland, to study conditions in India relating to the Development of Cattle and Dairy Industry. One of his important recommendations was the establishment of a well-equipped Dairy Research Institute at a central place situated in intensive dairy tract. This recommendation was accepted and it was decided to transfer the Bangalore Institute to a place more

representative of the conditions of dairying in the plains and to convert it into a first class Dairy Research Institute. In consequence, Dr. W. L. Davies of the National Institute for Research in Dairying, Reading, (U.K.) was appointed as India's first Director of Dairy Research in 1939. After careful consideration he recommended the location of the new Institute near Delhi. This recommendation was accepted. Two research sections of Dairy Chemistry and Dairy Bacteriology were opened in Delhi and temporarily housed in the Indian Agricultural Research Institute, New Delhi. The further implementation of the scheme had to be postponed due to conditions created by World War II. The office of the Director of Dairy Research and the two research sections were transferred to Bangalore and merged with the existing Institute to form the Indian Dairy Research Institute.

3. On the termination of the war, the Director of Dairy Research submitted fresh proposals for the establishment of the expanded Institute at a central place and these were accepted in principle. In order to meet the immediate post-war requirements some additional staff was sanctioned at Bangalore and a new section of Dairy Technology was also added. Early in 1946, Government invited Prof. H. D. Kay, Director, National Institute for Research in Dairying, Reading, (U.K.) to review the position and make suitable recommendations in consultation with the Director of Dairy Research. Prof. Kay recommended the early establishment of a National Dairy Research Institute at Delhi, including the establishment of a Dairy Science College as part of the Institute, and the continuance of the Bangalore Institute as a substation. Due to unforeseen difficulties arising out of the partition of the country, the implementation of these recommendations was again postponed.

4. The proposals relating to the establishment of a National Dairy Research Institute on the lines recommended by Prof. Kay were again revived in connection with the Second Five Year Plan. As the existing facilities at the Indian Dairy Research Institute, Bangalore were far too inadequate to meet the demands both in respect of research work as well as of training facilities, the Government of India decided to establish the National Dairy Research Institute at Karnal, where they had a Cattle-*cum*-Dairy Farm with an extensive area of over 2,000 acres of good cultivable land lying in the heart of the main dairying tract of the country. The Farm had also been maintaining pedigree herds of Tharparkar, Sahiwal and Red Sindhi cattle. The office of the Director of Research was located at Karnal in July, 1955 and the existing farm was amalgamated with it. Thus was established the National Dairy Research Institute at Karnal, now the premier centre in the country for research, training and extension in Dairy Science.

B. Organisational Set-up of the Institute

5. The National Dairy Research Institute has a Dairy Science College attached to it and three regional stations located at Bangalore

in the South, Bombay (Aarey) in the West, and Calcutta (Haringhata) in the East. The regional station at Bombay was established in June, 1962 and that at Calcutta was established in February, 1964. The Institute also functions as the Northern Regional Station.

The Committee have been informed that the areas for research and extension work provided at the National Dairy Research Institute and its regional stations have been defined. The present areas to be covered by the National Dairy Research Institute in each regional station are indicated below:

1. National Dairy Research Institute, Karnal.	U.P., Punjab and Rajasthan.
2. Southern Regional Station, Bangalore.	Kerala, Madras, Mysore and Andhra Pradesh.
3. Western Regional Station, Bombay.	Maharashtra and Gujarat.
4. Eastern Regional Station, Calcutta.	Assam, Bengal, Bihar, NEFA and Nagaland.

The organisational set-up of the National Dairy Research Institute, Karnal and its regional stations at Bangalore, Bombay and Calcutta is given in Appendix I.

C. Functions

6. The main functions of the Institute are:

(a) to conduct research on problems in connection with breeding, physiology and feeding of cattle for high milk production, technology of production, processing and transport of milk, manufacture of milk products, research on engineering aspects of dairy plant and equipment, research on extension methods, chemical, bacteriological and nutritive quality control of milk and milk products;

(b) to impart dairy training at undergraduate and post-graduate levels;

(c) to arrange for dissemination of results of research and proven information to the dairy industry and the farming community and conduct surveys of field problems for investigation; and

(d) to give advice and guidance to the dairy industry.

Apart from the normal research work of the Institute, several schemes are being operated at Karnal and Bangalore which are financed by the Indian Council of Agricultural Research, P.L. 480 Authorities, Dairy Society International, Department of Atomic Energy and Ministry of Defence.

CHAPTER II—BUDGET AND PLAN PROVISION

A. Budget of the Institute

7. An abstract of estimates and actual expenditure incurred by the National Dairy Research Institute during 1961-62 to 1963-64 is given below

	Original Estimates			Revised Estimates			Actual Expenditure		
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1. National Dairy Research Instt. Karnal.	2731,700	2344,600	2259,000	2346,600	2351;700	2604;800	2429,563	3023;365	2656;100
2. Dairy Science College, NDRI, Karnal .	763,200	746,000	688,300	666,500	577,300	659,200	450;607	492,848	587,400
3. W.R.S., N.D.R.I., Bombay . .	57,000	170,000	167,000	47,000	103,000	140,500	17,455	33,957	103,000
4. E.R.S., N.D.R.I., Calcutta . .	..	..	50,000	..	..	..	..	..	9,966
5. S.R.S., N.D.R.I., Bangalore . .	969,300	1283,500	1020,000	985,000	1247,700	957,900	930,660	1029,966	1044,000
TOTAL .	4521,300	4544,100	4184.300	4045,100	4279,700	4362,400	3828,285	4580,136	4366,466

NOTE.—The figures of actual expenditure for 1963-64 given above correspond to the final provision retained after re-appropriation.

B. Second Plan Provision

8. The establishment of the National Dairy Research Institute and Regional Stations, including Dairy Science College, was included as a Project under the Second Five Year Plan at a total cost of Rs. 160 lakhs. Provision was made for the establishment of two additional regional stations and reorganising the existing Regional Station in the South at Bangalore. The allocation of Rs. 160 lakhs was later on reduced to Rs. 118 lakhs as the original provision of Rs. 102 lakhs for buildings was revised in 1959 to Rs. 60 lakhs. As against the revised outlay of Rs. 118 lakhs during the Second Plan period, the actual expenditure, shown below, amounted to Rs. 86.35 lakhs or about 73 per cent. of the allotted amount:

(Rs. in lakhs)

Main Items	Amount allotted for the Second Plan	Amount spent during Second Plan
(a) Staff and Salaries	32	9·24
(b) Equipment.	26	22·58
(c) Buildings	60	54·53
TOTAL . .	118	86·35

The Committee understand that the main reason in the shortfall in the utilisation of the Second Plan provision is the delay in the establishment of two new regional stations, viz. *Western Regional Station and the Eastern Regional Station. The Western Regional Station was established in June,* 1962 *while the Eastern Regional Station has been established as late as February,* 1964. *The Committee see no reason why with advance planning it should not have been possible for the Institute to utilise the entire amount of Plan provision during the Second Plan period itself. The Committee recommend that the spill-over of projects from one Plan to another Plan should be avoided as far as possible.*

C. Third Plan Provision

9. An allocation of Rs. 150 lakhs has been accepted by Government of India for further development and expansion of the National Dairy Research Institute and its Regional Stations during the Third Five Year Plan. The programme of construction of buildings started in the Second Plan was continued; the facilities of plant, equipment and machinery for the dairy and the laboratories for teaching and research work were further augmented. During the Third Plan period, two new regional stations were established.

The allocation of Rs. 150 lakhs is divided into:

Wages and salaries: Rs. 36 lakhs;

Equipment: Rs. 39 lakhs;

and buildings: Rs. 75 lakhs.

The amount utilised during the first three years of the Plan period is as under:

(Rs. in lakhs)

	1961-62	1962-63	1963-64
Staff and Salaries . . .	0·69	3·72	6·18
Equipment . . .	16·50	14·27	13·33
Buildings . . .	6·00	8·50	4·00
TOTAL . . .	23·19	26·49	23·51
Budget estimates (1964-65) (Excluding Buildings)			Rs. 26·55 lakhs

The Committee have been told that the Fourth Plan estimated allotment would be for an outlay of Rs. 248 lakhs.

The Committee note that about Rs. 100 lakhs only out of the total provision of Rs. 150 lakhs are likely to be utilised by the end of the fourth year of the Third Plan, thus leaving about one-third of the provision to be utilised in the last year of the Plan.

The Committee are doubtful if the Institute would be able to utilise this amount fully. They apprehend that like the Second Plan, the projects envisaged in the Third Plan will spill-over to the next Plan period. The Committee stress that every effort should be made to avoid recurrence of such delays in putting the projects in operation in the Fourth Plan. They would suggest that a properly phased programme may be prepared in advance for implementation during the next Plan period.

CHAPTER III—CATTLE DEVELOPMENT PROGRAMME

A. Cattle Population

10. According to the livestock census of 1961, it has been estimated that there are, in India, 226.80 million heads of cattle including 51.13 million buffaloes and their progeny, showing 10·7 per cent. increase over that of 1956 census in the case of total cattle and 13·9 per cent. increase in the case of total buffaloes. This is a little over one-fourth of the world's bovine population. There are 51·0 million cows and 24·23 million buffaloes of over three years of age, kept for breeding and milk production, out of which 20·72 million cows and 12·58 million buffaloes are in milk and the rest are dry and have not calved even once.

B. Milk Production

11. In the matter of total milk production in the world, India ranks next only to the U.S.A. and the U.S.S.R., but the performance of the Indian milch animals, particularly of cows, is very poor. The average annual milk yield per cow* has been estimated at 400 lbs. in this country, while the corresponding figures for the Netherlands, Denmark, United Kingdom and U.S.A. are 8,576 lbs., 7,848 lbs., 6,393 lbs. and 5,512 lbs. respectively. It has further been estimated that in India, 94.3 per cent. of the present day milch cows yield less than 2 lbs. of milk per day and only 0.4 per cent. of cows yield over 4 lbs. per day. In the case of buffaloes, the corresponding figures are 19.2 and 18.8 per cent. respectively.

12. The milk yield in India is far from adequate for its vast population as the daily average consumption comes to even less than half of the optimum requirements of 10 ounces which has been recommended for a balanced diet by the Nutrition Advisory Committee of the Indian Council of Medical Research. In view of the long period that is likely to be taken for attaining the required level of milk production, that Committee suggested the desirability of attaining a target of 6 ounces per head per day in the near future. Even on the basis of 6 ounces *per capita* daily consumption of milk and the projected human population, milk production needs to be raised to nearly 33 million tons, as compared to the Third Plan target of 25 million tons.

13. The Committee have been informed during evidence that with a view to augmenting milk production in the country, a very ambitious programme of cattle development including establishment of *goshalas*

*Average annual milk yield of buffalo is 1077 lbs.

and intensive cattle development areas and development of feeds and fodders has been proposed. It has been stated that "if all these are approved by the Planning Commission, by the end of the Fourth Plan we may be able to supply 6 oz. of milk per head".

In view of the fact that the present production of milk falls short of even half of the optimum requirements for a balanced diet, the Committee strongly feel that there is need for a crash programme for cattle and dairy development which will have a substantial impact on milk production so that the minimum requirement of 6 oz. of milk per capita *may be achieved within the next Plan period.*

C. Development of Cows and Buffaloes

14. The poor productive capacity of the Indian cows and buffaloes has been attributed to indiscriminate breeding, under feeding and bad management over a number of years. One of the first problems that has received attention is that of breeding better types of cattle and their proper feeding and management in order to develop their potential productive capacity to the maximum extent and to increase milk production in the country. This has been sought to be achieved from three directions, *viz.* (i) developing pure-bred herds of typical milch breeds by selective breeding, and scientific feeding and management (ii) grading up village cattle for increased milk production by breeding with farm bred bulls of high milking quality, and (iii) cross-breeding of Indian cows with bulls of foreign breeds of high milking potency.

D. High milk yields at Institutes' Farms

15. The Sahiwal herd which has been developed over a period of more than 55 years by the Indian Agricultural Research Institute first at Pusa (Bihar) and later at New Delhi and Karnal, has increased its average yield from 2,200 to 5,000 lbs. of milk in lactation.

16. The National Dairy Research Institute has about 1,000 animals of three breeds—Tharparkar, Sahiwal and Red Sindhi—and a small number of Murrah buffaloes. Selective breeding is being carried out in all the breeds. It has been stated that the average milk yield per lactation is about 5,000 lbs. in the Sahiwal and Tharparkar breeds of cows and 4400 lbs. in the Red Sindhi breeds of cows. A cross breeding project, using frozen semen of Brown Swiss bulls obtained from the U.S.A. is under progress. All Sahiwal cows as well as a few Red Sindhi cows are inseminated with this semen. Between 100 to 150 bulls are being distributed every year to different State Governments to help in the upgrading of indigenous stock.

The Institute is also breeding Tharparkar with Hariana with a view to evolving a new breed which has been named as 'Karna' breed.

17. The Southern Regional Station, Bangalore maintains a herd of about 166 animals consisting of Tharparkar, Sindhi, Thari, Gir, Holstein cows, Jersey bulls and Murrah buffaloes and cross breeds. The primary breeding programme of this Station continues to be cross-breeding of Thari cows with bulls of foreign breeds, mainly Jersey, with the object of developing ultimately a breed capable of high milk production and adaptable to local climate conditions. The average lactation yield during 1963-64 was as follows:

Thari cows	..	1434 kgs.
Sindhi cows	..	1734 kgs.
Murrah buffaloes	..	1638 kgs.

18. The Indian Veterinary Research Institute, Izatnagar maintains a herd of Hariana cattle, which are primarily draught animals. In order to make dual purpose animals and in order to induce milk into them, experiments are being carried out, as a result of which they may become dual purpose animals. As a result of experiments carried out so far, the herd of Hariana cows of the Institute gives an average yield of 2,500 lbs., the average yield of which initially was 2.000 lbs. Murrah buffalo has been taken up for studies by the Indian Veterinary Research Institute.

These examples serve to indicate the vast possibilities of developing high milk yielding stock by careful and systematic breeding work.

19. There are a number of typical draught breeds of cattle (*e.g.* Kangayam, Hallikar) in which the cows are poor milkers while the bullocks are excellent work animals. A few so-called 'dual purpose' breeds (*e.g.* Hariana, Kankrej) in which the females give appreciable qualities of milk while the males are useful as draught animals, are also found in some areas. Attempts are being made to increase the milk yield of these two types of cattle without materially impairing their draft quality.

20. The Committee have been informed during evidence that an integrated approach has been applied in finding solution of practical problems of livestock breeding in the country. Whenever a big scheme is taken up on cattle breeding, it is formulated in consultation with the State Departments of Animal Husbandry, the Central Institutes, and the Indian Council of Agricultural Research. The key village

scheme* is a very good example of integrated and co-ordinated approach on cattle breeding.

21. The Committee have been further informed that the demand for cross-breeding with exotic bulls is increasing in the country. The States have indicated that they would like to have 1,361 exotic bulls and Central Government are trying to get 1,000 exotic bulls either through some foreign aid programme or even by purchase. The Central Government are persuading the State Governments to have a farm of exotic bulls for the purpose of multiplication. There are already two Jersey farms, one in Mysore and the other in the Himachal Pradesh. At present bulls produced there are being distributed to the various States for development. This is stated to be a coordinated scheme, 100% of expenses of which are borne by the Central Government.

The Committee consider that the grading up of cow and thereby raising the milk yield is a necessary and major task. The Committee need hardly stress that this task should be dealt with on a coordinated and concerted basis, with the help of the resources of State Government Farms and Military Dairy Farms as these farms can help for evolving a type of cattle useful under Indian tropical conditions. The Committee would suggest that Government may actively consider the question of augmenting the breeding facilities at the existing Central and State Government Farms and of increasing the number of these farms. At the same time the researches so far made by the National Dairy Research Institute and Indian Veterinary Research Institute in evolving better breeds should be widely publicised and popularised among the people.

The Committee further suggest that in the development programmes of cattle breeding, greater attention should be given also to the upgrading of the buffalo which is the principal dairy animal in many parts of the country.

E. Central Artificial Insemination Station, Bangalore

22. The Central Artificial Insemination Station commenced functioning from 11-12-1954 as an Indian Council of Agricultural Research Scheme. This Centre is concerned with maintenance of Jersey

*The scheme provides for an equal attention being paid to the cow and its owner. The scheme was initiated during the First Five Year Plan during which, 146 key village blocks with 555 key village units were established in different States. During the Second Plan, the scheme was continued with an expanded programme of activity. At the end of the Second Plan, 407 key village blocks including 64 urban Artificial Insemination Centres and 72 key village extension centres were established in the country. During the Third Plan, the Scheme has been further expanded with emphasis on consolidation of work under the first two Plans and rationalise its working. During the first two years of the Third Plan, 23 key village blocks and six Central Semen Collection Centres have been established.

bulls in good health, collection, evaluation, preservation of semen, despatch of semen to various stations on a systematic basis and maintenance of technical data pertaining to the supplies made. The figures regarding collection and distribution of semen from the supply stations are given below:

Year	No. of stations	No. of breeds used	Collections	Total quantity of semen in Ml.
1956-57	11	3	208	15,217
1962-63	63	8	1,924	3,23,144
1963-64	81	A. (1) Jersey	527	1,41,804
		(2) Holstein	144	22,256
		(3) Sindhi	508	1,44,872
		(4) Tharparkar	157	15,600
		(5) Sahiwal	71	3,560
		(6) Hallikar	204	29,848
		B. Murrah	399	70,096

The number of Stations receiving semen supplies as on January 25, 1965 is furnished (State-wise) below:

	Stations
Andhra	6
Kerala	44
Madras	8
Maharashtra	4
Mysore	38
TOTAL	100

Thus the Station has been meeting the needs of Kerala, Mysore, Madras, Andhra and Maharashtra mostly. The Committee have been informed during evidence that about 2 lakh inseminations are carried out from the semen which is sent from this Station.

23. The Committee desired to know whether the Central Artificial Insemination Station, Bangalore could supply semen of Jersey bulls to all the artificial insemination centres in the country and have been informed as follows:

> "Artificial Insemination Centres have been set up under the various schemes like Key Village Scheme, State Cattle Development Scheme, N.E.S. Blocks and Cross Breeding Scheme etc. The up-to-date number of these

Centres is not known. The number is, however, estimated to be several hundred. At all these Centres semen of Jersey bulls is not used, as it depends on the breeding policy and the breed used for upgrading or selective breeding of cattle in the area. In so far as the supply of Jersey semen is concerned, besides the Central Artificial Insemination Station, Bangalore, there are other Centres where Jersey bulls are maintained for supply of Jersey semen to certain artificial insemination centres."

24. The Committee have been informed during evidence that there is a scheme to increase the artificial insemination centres in the Fourth Plan. In the intensive cattle development areas and also in the key village blocks provision has been made for the establishment of artificial insemination centres. For each of these intensive cattle development area, a major artificial insemination unit would be established which would be able to take care of one lakh breedable cows and buffaloes.

The Committee consider that the introduction of artificial insemination technique has opened up tremendous possibilities of rapidly improving the milking quality of vast number of Indian cows and buffaloes scattered in different parts of the country. The Committee recommend that this technique should be popularised on wider scale amongst the farmers for grading up village cattle. As the modern trend is to use semen of pedigree bulls for upgrading the cattle, the Committee also suggest that each intensive cattle development area and key development block may be provided with a major artificial insemination unit as early as possible.

F. Cattle Nutrition

25. It has been stated that in a comprehensive programme of cattle development, feeding has a very important place. The improved progeny with greater inherent potentialities for higher milk production and improved draught capacity cannot exhibit their qualities in full if they are not reared on a proper plane of nutrition. In India, it is not the dearth of cattle but an important factor, apart from the quality of the breed, which has stood in the way of increased milk production, is the lack of cattle feed without which no milk can be formed. The shortage of cattle feeds and their low nutritive value is one of the major bottleneck in the attempts at cattle development.

According to the Feeds and Fodder Sub-Committee of the Central Council of Gosamvardhana (1961), there is a shortage of green fodder to the extent of 257 million tons, straw and 'kadbi' (dried sorghum stalks), 26 million tons and concentrates 27.2 million tons.

G. Newer Varieties of Feeds

26. It has been stated that the National Dairy Research Institute is making constant effort to find newer varieties of fodders of high nutritive values. A variety of quickly growing tree, viz. *leucaena glauca* has been successfully grown from seeds obtained from Hawaii.

27. In fodder and forage grasses, two outstanding varieties, namely, "Pusa Giant Napier" grass for irrigated fodder and "Pusa Giant Anjan" grass for dryland pasture, have been produced by the Indian Agricultural Research Institute. In berseem, a valuable fodder legume, another outstanding variety, "Pusa Giant Berseem" has been produced. Some of the foreign seed and planting material introduced by the Indian Agricultural Research Institute have been found worthy of large-scale cultivation and are being extensively grown in the country.

28. In an attempt to bridge the gap by using new available feed resources, 42 edible tree leaves have been investigated as famine fodders for livestock by the Indian Veterinary Research Institute. Sixteen species of fodder trees like Sandan, Gauj, Marur Fali, Banj, Pipal, Gular, Kachnar, Bans, Tut, Bel and Jharberi, have been recommended for afforestation so as to be useful as cattle fodders. The hitherto unused sources of fodder such as Kans grass, Munj grass, Kantiara, Panwar straws, Cassia tora, Water hyacinth, sugarcane tops and tapioca roots have been processed as silage to be fed to cattle as roughage or energy feeds. Now cheap protein sources have also been discovered in the use of mango seed kernels, jaman seeds, Panwar seeds, tamarind seeds, Mahua cake, babul pods, sunhemp seed and guar cake and fish meal as supplement of concentrate of protein rations for feeding livestock. More than 25 subsidiary, useful feeds, which are being wasted now have been shown to be new sources of livestock feeds.

29. The Committee have been informed that five important desert grasses have been selected by the Central Arid Zone Research Institute, Jodhpur. These grasses can be cultivated under the arid conditions. These are very palatable to the animals. During 1963-64, about 7 tons of seeds of these grasses were collected and distributed to the State Departments of Animal Husbandry, Forestry and Agriculture, the Development Blocks in the Arid Zone and other developmental agencies in various States.

30. Government of India have established in 1962 the Indian Grassland and Fodder Research Institute in order to organise and channelise through a central research organisation work relating to grasses and fodders.

The Committee note that with the ever-increasing emphasis on food production considerable portions of land and other natural resources have been increasingly diverted from grazing land for raising

food crops accentuating the already critical situation of animal nutrition in the country. In this context, the Committee would like to lay emphasis on the researches being carried out at the National Dairy Research Institute, Indian Veterinary Research Institute, Central Arid Zone Research Institute, Indian Grassland and Fodder Research Institute, as well as various Soil Conservation Research, Demonstration and Training Centres in developing those grasses which will grow all the year-round with less irrigation and fertilizer facilities. The Committee consider that an intensive programme for introducing such grasses in the dry lands and arid zones, if launched on a priority basis in co-operation with State Governments, will not only meet the growing demands of cattle feed and fodder to a great extent but also help in maintenance of soil fertility and soil conservation.

The Committee would also like to invite attention to para 20 of their Eightieth Report on Indian Grassland and Fodder Research Institute wherein they have suggested that there should be close and intimate coordination between the various research institutes already engaged in the task of developing suitable grasses and fodder for dairy animals and the newly established Indian Grassland and Fodder Research Institute so as to avoid overlapping and duplication of work and to intensify research on the more promising projects.

H. Animal Nutrition Research at Indian Veterinary Research Institute and National Dairy Research Institute

31. The Committee have been informed during evidence that "the Indian Veterinary Research Institute organises research on fundamental nutritional problems while applied nutritional problems of milk production are taken up at the National Dairy Research Institute. These are two distinct spheres and they cannot be amalgamated under one. It would not be advantageous to amalgamate these two because the researches are carried out with the different ojectives and it may lead to complications if they are under one".

It has been stated that a large amount of data regarding the composition and nutritive value of Indian cattle feeds including concentrates and roughage has been collected. The four regional animal nutrition centres of the Indian Council of Agricultural Research are engaged in assessing the nutritional needs of cattle and the quantitative-*cum*-qualitative sufficiency of feeds and fodders in different regions of the country.

The balancing of cattle rations by the use of cheap and locally available material is also being studied and various formulae have been suggested with a view to formulate cheap and balanced rations for dairy cattle so as to reduce the cost of feeding and milk production.

As a result of extensive survey of mineral deficiency in livestock, throughout the country, a suitable mixture containing the required

major minerals and trace minerals has been patented and released free of cost so as to be available at a cheap price for feeding livestock for their optimum work and production and for protecting them from any mineral deficiency. The various amounts of the mineral mixtures for different livestock have also been worked out and recommended by the Indian Veterinary Research Institute.

The Committee recommend that the cheap and balanced rations evolved by the Indian Veterinary Research Institute should be widely disseminated to the dairies and farmers so that the cost of feeds and milk production is brought down in the country.

The Committee would further suggest that the data on the mineral mixtures should be passed on to all the cattle feed milling plants and further research in this regard be done in close liaison with these mills.

I. Uneconomic and Unproductive Cattle

32. The First Dairy Industry Conference (1964) observed as follows:

> "The Conference views with alarms the rapid increase in the population of cattle in the context of the tremendous shortage of feed and fodder in the country, and considered it highly necessary that immediate and effective steps should be taken to control its rise in population and to dispose of the unproductive and uneconomic cattle by suitable means."

33. The Committee have been informed during evidence that Government's plan to establish *gosadans* would be very effective in this regard. At present there are about 60 to 70 *gosadans* in the country, each having about 500 to 2000 unproductive and uneconomic cattle.

It was, however, admitted that the problem is of such magnitude that it would not be possible to find a solution by establishing *gosadans* only.

34. The Committee have been informed during evidence that "the only effective method would be slaughter. That is the conventional method used in all countries. But because of the sentiments of our people, this method cannot be used here. If we put a complete ban on cow-slaughter, we shall have to put up with all the problems arising therefrom".

35. The Indian Veterinary Research Institute has been carrying out experiments to find out a suitable method of sterilisation of cows. The Institute has suggested insertion of a spring into the uterus of the cows. This method is receiving a field trial at Hissar on a large number of animals and the results are awaited. The Anand Agricultural Research Institute in collaboration with the Agricultural

Research Institute of Boltsville (USA) are working on the insertion of double S, plastic loop, in the uterus of the cows and buffaloes. The indications are stated to be good so far. Government is examining the possibility of introducing it on pilot basis immediately.

The Committee have been informed during evidence that "removal of ovaries in the cows is very simple. In some countries like America and Australia, they do this in beef cattle. We gave that advice; but our people are sentimental".

The Dairy Research Advisory Committee have suggested that the National Dairy Research Institute should give priority for research on "Immunological aspects on Continuous Sterility".

It is now widely recognised that weeding of inferior stock of cattle is a necessary complement to any systematic programme for improvement of cattle breeding. In view of the tremendous scarcity of green fodder and concentrates required by the rising cattle population and the meagre chance of getting any additional land for growing fodder crops, the Committee consider that all-out efforts are required to be made to reduce the inferior/dry stock of cattle or at any rate effectively check their multiplication. The Committee suggest that Government may use their information and extension agencies for focussing light on these central facts so as to overcome any popular prejudice which may be impeding the adoption of scientific measures to achieve this end.

CHAPTER IV—TRAINING

A. Requirement of Dairy Personnel

36. The requirements of dairy personnel during the Third Plan were estimated at 2830 of which 625 will be degree holders, 975 diploma holders and 1230 other categories of technical personnel. The Third Five Year Plan envisaged expansion of training facilities for the Indian Dairy Diploma (I.D.D.) at Bangalore, Allahabad, Anand and Aarey and for the B.Sc. (Dairying) and post-graduate studies at Karnal. A statement showing the progress so far made in training dairy personnel and the contribution made by the Institute is given in Appendix II.

B. Provision of Training Facilities at the Institute and Regional Station

37. The B.Sc. (Dairying) course which was started in 1957 was bifurcated into two courses, one in Dairy Technology and the other in Dairy Husbandry, to afford specialisation in these areas. The Post-Graduate wing of the Dairy Science College of the Institute was instituted in 1961 and the M.Sc. (Dairying) course offering specialisation in the fields of Dairy Husbandry, Technology, Chemistry and Bacteriology was started in 1961. A course in Dairy technology at the diploma level was also started in 1961.

Tutorial Workshops

38. In addition to the regular training programme of the Institute, special tutorial workshops, attended by dairy teachers from the different dairy training centres of the country, were organised each year during the period from 1961 to 1964 in collaboration with the Food and Agriculture Organisation and United Nations International Children's Emergency Fund. The object of these workshops, the first of their kind to be organised in the country, was to enable teachers to develop the faculty of objective thinking and to receive training in teaching methods for dairy students at the diploma level. Intensive theoretical and practical training in different aspects of dairy science as well as in the principles and methods of teaching was given in these workshops.

The Committee are glad to note that the National Dairy Research Institute organised tutorial workshops for the benefit of dairy teachers from various dairy training centres of the country. The Committee suggest that tutorial workshops may be held at suitable intervals so that dairy teachers are brought in direct contact with the National Institute. This would not only make for improvement in standards but also bring about desirable uniformity in dairy teaching.

Other Short Courses

39. Specialised training courses in Dairy Extension (Three months) and Dairy Engineering (10 months) were organised at Karnal from November, 1962 for participants from State Governments as well as private candidates.

It has been stated that Indian Dairy Diploma Course is also imparted at the Southern Regional Station, Bangalore.

Recognition of Courses by Universities

40. The Committee have been informed that under-graduate and post-graduate training is imparted at the Institute (Dairy Science College) under the auspices of the Punjab University. That University has also recognised the National Dairy Research Institute, Karnal as a centre for research for Ph.D. degree in the Faculties of Agriculture and Science. The Bombay University has also recognised the National Dairy Research Institute, Karnal and its Southern Regional Station, Bangalore, as centres for research for M.Sc. and Ph.D. degrees in the subjects of Microbiology and Biochemistry.

Selection of Trainees

41. The Committee have been informed during evidence that the selection of trainees for admission to Indian Dairy Diploma Course and Dairy Science College is made by three methods: (i) by writing to the State Government; (ii) by advertisement; and (iii) by interview. The names of the State nominees are sent by the respective State Governments who have their own selection committees. A representative of the National Dairy Research Institute is associated with the State Selection Committees. The private candidates are recruited primarily through advertisement and interviews. If adequate number of trainees are not deputed by the States, private candidates possessing the requisite qualifications are given admission.

Inadequate Hostel Facilities

42. The Committee have been informed that by the end of the Third Five Year Plan, it is expected that the National Dairy Research Institute and its Regional stations would fully be set up and will be in a position to meet the demand of trained technicians to the extent of 60 per cent and also be in a position to give considerable assistance to the Dairy Projects and Dairy Industry through its Research and Extension programme. It has also been stated that "more trainees cannot be admitted at the National Dairy Research Institute, Karnal/ Southern Regional Station, Bangalore due to limited hostel facilities".

The Committee would suggest that hostel facilities should be suitably augmented so as to ensure that teaching capacity in the Institute

is fully utilised. In this connection, the Committee would like to draw attention of the Government to the design of the newly constructed hostel at the National Dairy Research Institute, Karnal. The Study Group of the Estimates Committee which visited the Institute in October, 1964 were not quite happy about its design from the utility point of view. The Committee hope that Government would see to it that the second hostel at least will have a better design.

Utilisation of authorised seats for various courses

43. The following table gives the percentage of seats actually utilised out of authorised seats for diploma and post-graduate courses at the National Dairy Research Institute during the period 1957 to 1964:

Year	M.Sc.	B.Sc.	I.D.D.	Dairy Engg.
1957	—	105%	—	—
1958	—	80%	—	—
1959	—	100%	—	—
1960	—	80%	—	—
1961	85%	72%	66%	—
1962	125%	100%	100%	86%
1963	125%	100%	100%	33%
1964	100%	66%	100%	Figures not available

The Committee feel distressed to note that notwithstanding the marked shortage of training facilities as compared to the demand, even the existing capacity in the National Dairy Research Institute for B.Sc. and Dairy Engineering courses is not being fully utilised. In fact, the utilisation of the capacity for B.Sc. courses in 1964 has come down to 66 per cent as compared to the preceding year and the utilisation of the capacity for Dairy Engineering course in 1963 was only 33 per cent while figures for 1964 have not been furnished. As this non-utilisation of training facilities constitutes national wastage the Committee would urge that all possible measures should be taken to attract adequate number of meritorious students interested in the subject to take up the courses.

C. Shortfall in Third Plan Requirements of trained personnel

44. The First Dairy Industry Conference (1964) observed that 'as a result of delay in the establishment of regional dairy institutions

the output of dairy trained personnel during the Third Five Year Plan is likely to fall short of the proposed target by about 50 per cent. Taking note of this and the additional requirements of new dairy projects* likely to be taken up in the Fourth Five Year Plan, the conference considers that 4,000 persons will need to be trained during the Fourth Five Year Plan".

The Committee consider that if the dairy projects in the Fourth Plan are to be executed according to target, it is imperative that the shortages in the dairy personnel should be made good as expeditiously as possible. The Committee feel that the Board of Dairy Education which was constituted by Government in 1961 *with the Director, National Dairy Research Institute as Chairman should give serious consideration to this matter and draw up a concerted plan of training in consultation with State Governments.*

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*Following information was supplied by the Ministry of Food and Agriculture at the time of factual verification of the Report :—

"Out of 55 milk supply schemes, 8 rural creameries, 4 milk powder factories 2 cheese factories and 4 cattle feed compounding factories envisaged in the Third Five Year Plan, progress has been made by completing 4 milk supply schemes; by starting 12 pilot milk supply schemes as a prelude to the establishment of main dairy plants; and work on 27 milk supply schemes is under different stages of implementation. As regards milk powder factories, 2 have been commissioned and the implementation of another two has been taken up along with one rural creamery. One cattle feed compounding factory has also been commissioned.

CHAPTER V—EXTENSION ACTIVITIES

A. Establishment of Extension Unit

45. The Committee have been informed that a proposal for the creation of a nucleus for extension work was included in the consolidated scheme for the establishment and development of the National Dairy Research Institute which was considered by the Expenditure Finance Committee (Ministry of Food and Agriculture) at their meeting held on 24th July, 1956. The original proposal was recast and the revised scheme for the establishment of the Division of Dairy Extension was forwarded by the Institute on the 25th August, 1960. The objects of the Division of Dairy Extension were to undertake field studies of dairy problems in villages and urban dairies, perform field testing of the results of research, disseminate technical information through various extension techniques and media, conduct research in dairy extension techniques, evaluate the effectiveness of the extension programme, maintain liaison with national and international organisations and give technical advice, do publicity and public relations work, and impart training in dairy extension. The revised scheme was sanctioned by Government in May, 1961. A nucleus unit of the Extension Division was established at the Institute towards the end of 1962.

The revised scheme envisaged the recruitment of 27 technical and clerical staff in 1960-61 and about 110 by the end of the Third Plan period.

The Committee have been informed that following is the existing strength of staff in the Division:

Class I	1
Class II	2
Class II (non-gazetted)	4
Class HI	11
Class IV	2
Total	20

It has been stated that the Division is not fully equipped and the post of the Head of the Division has not been filled up.

The Dairy Extension Section of the Southern Regional Station, Bangalore consists of one Senior Technical Assistant and two Technical Assistants.

46. With the advent of the Division of the Extension, it was anticipated that about 100 persons would be trained every year in the different courses in dairy extension, and these in turn would constitute the complement of staff for doing extension work for about 165 new projects proposed to be set up in the Third Five Year Plan for further development of dairy industry in India. The Committee are informed that three courses in dairy extension of 3 months duration were organised from November 1962—January, 1963, October-December 1963 and October-December 1964. Thirty-six trainees were given training in the extension methods of dairy practices.

The Committee are unhappy to note that although the nucleus of dairy extension was a part of the National Dairy Research Institute Project which was approved by the Expenditure Finance Committee (Ministry of Food and Agriculture) as far back as July, 1956, the formal sanction therefor was accorded only in May, 1961 and it was actually brought into being only towards the end of 1962. Besides, till this date the Division of Extension is neither fully equipped nor properly manned. That this has adversely affected the training of extension personnel is evident from the fact that the Institute has so far (end of 1964) trained only 36 trainees in about 3 years whereas it was planned to train 100 trainees annually. The Committee are distressed to note the poor performance of the Institute in regard to the training of extension personnel and urge that prompt and energetic steps may be taken to equip the Institute and its regional stations with proper facilities for extension work.

B. Conferences

47. With the establishment of the Division of Extension, it has been stated that the Institute was able to organise or help in organising the following Conferences which were attended by the research workers and personnel connected with dairy industry, management and education:

	Name of the Conference	Place	Year
1.	First Dairy Management Conference	Ahemedabad	December 15, 1963.
2.	Cheese Conference	Karnal	January 7-8, 1964.
3.	First All-India Dairy Industry Conference	Bangalore	February 5-8, 1964.
4.	Second All India Dairy Industry Conference	Calcutta	January 18-22, 1965.

The Committee welcome the practice of having regular meetings of research workers with the representatives of the industry, trade and farming community so that the research may be of greater benefit.

The Committee would further suggest that each Regional Station of the National Dairy Research Institute may convene a meeting annually of the dairy technical personnel to acquaint them with the programmes and progress of the research and extension activities of the Stations and exchange ideas with them on any problems which need attention of the Station.

C. Popular Pamphlets

48. Dissemination of results of researches to farmers by means of popular pamphlets is part of the normal extension activities. The Committee have been informed that the Southern Regional Station has issued popular pamphlets/handbills in Telugu, Kannad, Malayalam and Tamil. Issue of such popular pamphlets in other regional languages would also be started by the regional stations in the east and west. The Committee have been informed during evidence that so far assistance of State Governments has not been taken by the Institute and its regional stations in educating the rural milk producers in the new techniques developed by the Institute.

The Committee feel that any extension programme which does not enlist the assistance of the relevant Government departments and other concerned organisations, in educating the rural milk producers in the new techniques is not likely to bear fruit. The Committee, therefore, recommend that the results of researches obtained at the regional stations as also other necessary technical information may be disseminated for the benefit of the rural milk producers with the assistance of the concerned Government Departments and other concerned organisations dealing with milk production. The Committee would suggest that the question of bringing out publications in regional languages may be taken up by the Central Government with the State Governments.

CHAPTER VI—MISCELLANEOUS

A. Co-ordination between research Institutes concerned with dairying

49. Apart from the National Dairy Research Institute, research on dairying is also being conducted at various agricultural and veterinary institutions in different States in the country. The Indian Agricultural Research Institute, Indian Veterinary Research Institute, Indian Institute of Science, Central Food Technological Research Institute and Military Dairy Farms are also interested in certain important aspects of dairy research.

The Committee have been informed that all the dairy research work is co-ordinated through the Dairy Research Committee of the Indian Council of Agricultural Research which meets twice a year. The progress reports of the current year and the technical programmes of the following year are discussed by the Committee which *inter alia* includes the representatives of the Universities and the industry.

The Committee feel that enough attention has not been given by Government to ensure co-ordination between the National Dairy Research Institute and other Institutes interested in certain aspects of dairy research. The Committee cannot too strongly urge the importance for effecting purposeful co-ordination betwen the National Dairy Research Institute and the Indian Veterinary Research Institute, the two sister organisations dealing with more or less correlated problems. There is also a paramount need for maintaining effective liaison with the dairy institutes in the various States. The Committee would like the Government to devise suitable measures by which greater co-ordination is brought about between the National Dairy Research Institute and other dairy institutes in the country so that duplication of research effort is avoided as far as possible and a well—co-ordinated and prurposeful programme of research suited to practical requirements is taken up.

B. Dairy Research Advisory Committee

50. The Government of India appointed a Dairy Research Advisory Committee in 1963 to examine the research work done so far by the National Dairy Research Institute and its regional stations and to suggest and guide future lines of work. The Committee has recently submitted its first report. The Dairy Research Advisory Committee have *inter alia* recommended that—

> "A very close contact of the Institute with the dairy industry is very essential to enable the Institute to develop the research and training programmes to suit the specific

needs of the industry and for the industry to benefit by the results of these programmes."

A list of research problems suggested by that committee, for dropping, modification etc. is given in the Appendix III. The Estimates Committee have been informed during evidence that "the recommendations made in the report of Dairy Research Committee have been received only recently and the research programme is being gradually reoriented in accordance with the recommendations."

The Committee welcome the constitution of the Dairy Research Advisory Committee and hope that its recommendations will be considered by Government so that the research work of the National Dairy Research Institute is reoriented without delay to suit the specific needs of the industry.

C. Achievement Audit

51. In their Seventh Report (1953-54), the Estimates Committee had recommended that a periodical achievement audit, every three years or so, should be undertaken in the case of the agricultural research institutes with a view to assessing the actual achievements of practical utility to the credit of these Institutes. Later in their 53rd Report (1956-57) the Committee suggested a quinquennial audit of achievements, as a three year period might be considered too short to assess achievements in the field of agricultural research.

Though the National Dairy Research Institute was established in 1955, no assessment has yet been made of the impact of the dairy research carried out at the Institute and its regional stations. The Committee understand that Government of India have recently appointed an Achievement Audit Team to assess the contribution made by the Institute.

The Committee would recommend that performance reviews of the National Dairy Research Institute and its regional stations may be made in the third/fourth year of each Five Year Plan period so that the suggestions regarding future line of development can be duly incorporated in the next Plan period. The Committee also suggest that the Indian Council of Agricultural Research should maintain a list of specialists on an All-India basis whose services can be obtained. when necessary for constituting the Achievement Audit Team.

D. Dairy Engineering and Technology Divisions

52. The broad nature of activities of the Dairy Engineering Division are teaching, servicing (erection and maintenance), and research. It has been stated that due to paucity of staff, all the staff members (2 Assistant Professors, 2 Demonstrators, 1 Research Officer, 1 Assistant Research Officer, 1 Farm Engineer and 2 Technical Assistants) are mainly engaged for satisfying the immediate needs e.g. the

teaching and servicing work, consequently very little could be done for the research work.

There is a Dairy Engineering Section of the Southern Regional Station, Bangalore which consists of a Farm Engineer, 2 Technical Assistants, 2 Demonstrators and one Supervisor. The activities of this section are: maintenance of agricultural machinery equipment, transport vehicles, electrical instruments and Institute buildings; testing of engineering equipment and other instruments; fabrication of simple equipments; and training of students of Indian Dairy Diploma Course etc.

The broad nature of activities of Dairy Technology Division are instructions, research and development on milk and milk products technology.

There is also a Dairy Technology Section at the Southern Regional Station, Bangalore which besides doing routine handling and distribution of milk, and milk products, training etc., undertakes special investigation on subjects of dairy technology on behalf of Government Departments.

The Dairy Research Advisory Committee has observed that the "research work undertaken by the Divisions of Dairy Technology and Dairy Engineering was, however, found to be not commensurate with the facilities available in regard to the accommodations, equipment and staff."

The Committee have been informed during evidence that "there has been a research programme for these Divisions but the progress is, however, slow due to non-availability of experienced staff with research background in these subjects. After the visit of the Dairy Research Advisory Committee, they have suggested a definite programme for these Divisions in order to make full use of the facilities available in these Divisions."

The Committee are unhappy to note that the research work in the Divisions of Dairy Technology and Engineering are not commensurate with the facilities available. The Committee would stress that a properly co-ordinated programme for intensifying research in problems of practical importance to dairy industry should be taken up in these Divisions. The achievements of these two Divisions may again be critically reviewed after a year or so by the Dairy Research Advisory Committee to make sure that the improvements on the suggested lines have in fact taken place.

E. Designing and Fabrication of Testing Kits

53. Testing kits for conducting the Hansa Milk Test and Detergent Test for fat determination in the villages under field conditions have been designed and fabricated by the National Dairy Research Institute.

The Institute has prepared and supplied 70 kits (for Hansa Milk Test) to different dairy plants so that they can regularly use it for detecting cows milk.

The Committee have been informed that the necessary serum required for the Hansa Milk Test will have to be prepared under closely supervised agency and the Institute has taken up the manufacture at Karnal and Bangalore and also propose to manufacture the serum at Bombay and Calcutta.

The Committee feel that as the Hansa Milk Test becomes more and more popular, the testing kits including the serum may be commercially exploited with the help of the National Research Development Corporation.

F. Small-scale Milk Chilling Unit

54. The National Dairy Research Institute has designed a small scale milk chilling unit with a capacity of about 4 maunds of milk and costing about Rs. 2,000. The device does not require the use of electricity. The Institute has carried out some trials with one unit and is fabricating a dozen of these units for sending them to different regions, so that they would be tried under field conditions. The Committee have been informed that "as soon as the reports on these units are available, the idea would be given either to some commercial firm or large-scale manufacture taken up."

The Committee would recommend that as soon as the milk chilling unit will be fully developed, it should be patented by the Institute and commercially exploited through the National Research Development Corporation.

G. Research on Rennet

55. Most of the animal rennet used in the manufacture of cheese is at present being imported from foreign countries. The annual import of rennet powder is about 80 kilos costing about Rs. 12,000 to 13,000.

The National Dairy Research Institute is conducting research on the preparation of animal rennet from abomasum of calves of buffalo and cow by introducing the fistula into the fourth stomach. The Committee have been informed that this research work has given a very promising result to the production of rennet in our country, particularly because of the sentimental objection to slaughtering of cows for the production of rennet. By this method over a 3 month period, a calf is able to produce almost 100 times of rennet produced by the slaughter of a single animal. The Committee have been further informed that this method has no adverse effect on the calves.

The Committee suggest that the research work on the production of renner should be intensified so that in course of time the country could be made self-sufficient in the production of rennet.

H. Dairy Machinery

56. The Committee have been informed that the country is at present largely dependent on imported equipment. The Minister for Food observed at the First Dairy Industry Conference (1963) as follows:

> ".....a reason for a progress slower than that desired is the paucity of modern dairy equipment which has to be imported and the meagre foreign exchange available therefor. The progress of dairy schemes has been as fast or as slow as the availability of foreign aid i.e. from agencies like UNICEF and Colombo Plan."

The cost of equipment for the dairy development programme under the Third Plan is roughly estimated at Rs. 8 crores.

57. A Dairy Machinery Committee was set up by Government in July, 1960 to assess the requirements of the equipment, formulate programmes of production and assist the manufacturists in the execution of the programme. The Committee has not concluded its work, though it has supplied the information to the industry regarding the country's requirements for the Third and Fourth Plans. Four firms, have been licensed so far for undertaking the manufacture of equipment and equipment worth about Rs. 50 lakhs was produced in 1963. The Indian Standards Institution is also helping in standardising the specifications for the equipment required. The Indian Standards Institution has already prepared standards for about 25 items.

58. The Second Dairy Industry Conference (January, 1965) expressed their concern "at the large unutilised dairy equipment manufacturing capacity that exists in India—installed capacity approximately 300 lakhs, production in 1963—60 lakhs; in 1964—only 45 lakhs. The progressive manufacturing programme envisaged by the manufacturers whereby the quantum of imported component is reduced progressively, cannot, therefore, be carried out."

The Committee find it difficult to reconcile the views expressed by the Second Dairy Industry Conference that large capacities available with manufacturers of dairy equipment lie unutilised with the Government's claim that the reason for slow progress in dairying is the paucity of modern dairy equipment. The Committee would suggest that there should be effective coordination between the Ministry of Industry and Supply and the Ministry of Food and Agriculture. They would suggest that the Dairy Machinery Committee should be asked to go into the matter in detail and suggest ways and means of

utilising the existing capacity and to take suitable measures to meet the country's requirements during the Fourth Plan period.

The Committee would incidentally like to point out that the Dairy Machinery Committee does not include any representative of National Dairy Research Institute which is the premier Institute in Dairying and has Divisions of Dairy Technology and Engineering and knows the practical problems at first-hand through extension wing and its regional stations.

The Committee suggest that Dairy Machinery Committee should include a representative of the National Dairy Research Institute.

59. The Committee have been informed that no study has yet been made as to the suitability of dairy implements evolved in foreign countries under Indian conditions.

The Committee consider that advances made by the foreign countries in dairy equipment and implements should be continuously and systematically studied by the National Dairy Research Institute with a view to adopt them and encourage their manufacture in the country.

CHAPTER VII—CONCLUSION

60. The contribution of cattle to the Indian economy as a provider of traction power, as a producer of fertilizers, as a giver of leather and innumerable other organic substances and above all as a producer of nutritive foods is unequalled by any other animal. However, in spite of a big cattle population, there is an acute shortage of milk in the country. The Committee are aware that though the general performance of the Indian cow in milk yield is extremely poor, the performance of cow at the various research institutes and farms have definitely indicated that with better breeds, proper feeding and management, production of milk in the country can be increased to a great extent. *As the cattle development is intimately linked up with agricultural development, the Committee consider that promotion of the animal husbandry can make a meaningful contribution to the solution of the basic problems facing the nation and therefore urge the Government to take energetic steps in this direction.*

61. The bulk of milk is produced in villages in innumerable and scattered small scale holdings and the greatest demand for fluid milk as well as milk products is from urban centres. Due to backwardness of the farmers and due to the difficulty of transport, sanitation and chilling units, a large quantity of milk goes waste at present. Cooperative milk collecting unions and milk supplying unions have been set up in several parts of the country and are doing good job of solving the twin problems of collecting the milk from rural areas and supplying the good quality of milk to urban areas. *The Committee would urge the encouragement of cooperative in dairying and animal husbandry.*

INDIAN VETERINARY RESEARCH INSTITUTE, IZATNAGAR

CHAPTER VIII—INTRODUCTORY

62. In ancient India people had sufficient knowledge of the diseases of farm animals and the methods of curing them. Though in the light of modern advances made in the field of veterinary science, the techniques adopted for the diagnosis of the disease of an ailing animal and its treatment in the olden days may appear to be quite crude, yet they make an interesting study. Even from the very early times, treating of the ailing cow has been considered to be the most essential duty of every individual. Like most other things, this science also deteriorated during the long centuries of foreign rule.

A. Historical Background of the Institute

63. The Indian Veterinary Research Institute, which is the oldest research organisation in the country made a modest beginning at Poona in December, 1889. As modern refrigeration technique was not then known and as the populous part of the city precluded working on highly infectious cattle diseases, it was shifted in 1893 to Mukteswar which is situated at a height of 7,500 ft. above sea level in the Kumaon range of the Himalayas. The large scale production of Anti-Rinderpest Serum and its distribution in the field necessitated the setting up of a Station in the plains for quicker and cheaper distribution of biologicals. A suitable site was acquired for this purpose in 1913 at Izatnagar—a suburb of Bareilly. This station, however, started functioning properly after the first World War in 1922, and it has been considered as the prestige institute in the field of animal science.

B. Organisation & Functions

64. The Indian Veterinary Research Institute has the following six research divisions:—

(i) Division of Bacteriology and Virology.

(ii) Division of Pathology.

(iii) Division of Parasitology.

(iv) Division of Animal Nutrition.

(v) Division of Poultry Research.

(vi) Division of Animal Genetics.

In addition to the six research Divisions, there is the Division of Biological Products which is primarily intended for the large scale manufacture of veterinary biologicals. Besides there are, both at

Izatnagar and Mukteswar, auxiliary Sections, like the Estate, Veterinary Engineering and Medical, which act as service sections of the research side.

The Post-Graduate College of Animal Science which was established in 1958, is attached to the Institute.

Main functions of the Indian Veterinary Research Institute are as follows:—

(i) *Researches.*—Both fundamental and applied researches are carried out in several branches of animal science.

(ii) *Teaching.*—The Institute imparts teaching at Post-Graduate, Graduate and Diploma levels in animal sciences.

(iii) *Advisory.*—The Institute acts as a clearing house for providing necessary advice in solving problems relating to livestock diseases and animal husbandry problems of the Indian Union.

(iv) *Extension.*—The extension work is done with a nucleus staff. Most of the research work that has been completed is carried out on a pilot basis.

Some of the achievements of the Research Institute are given at Appendix IV.

CHAPTER IX—BUDGET AND PLAN ALLOCATION

65. The receipts and expenditure of the Indian Veterinary Research Institute for the years 1961-62 to 1964-65 are as follows:—

Year	Receipt*	Expenditure
	Rs.	Rs.
1961-62	20,68,550	51,65,261
1962-63	12,50,361	56,57,934
1963-64	15,32,410	60,82,271
1964-65	12,00,000	71,36,000

66. *Third Plan Allocation and Expenditure.*—The amount allocated to the Indian Veterinary Research Institute Izatnagar/Mukteswar during the Third Plan is Rs. 68·00 lakhs. The broad distribution of this provision is as under:—

		Rs.
1. Buildings	..	53·47 lakhs
2. Staff	..	7·01 lakhs
3. Equipment	..	1·69 lakhs
4. L.C.A.R. Scheme	..	5·83 lakhs

It has been stated that the entire Plan provision of Rs. 68 lakhs will be utilised by the end of the Third Plan.

67. *Buildings.*—The Committee are informed that out of the total provision of about Rs. 54 lakhs for buildings, a little over Rs. 45 lakhs was provided for the buildings which were spill-over of the Second Five Year Plan. A total number of 25 constructional works were approved for the Third Plan period, out of which 19 constituted spill-

*The annual receipts of the Institute are on account of sale of biological products, dairy products, tuition fees, etc.

over of the Second Five Year Plan. Only 6 new works were added during the Third Plan. Out of 25 buildings, 9 buildings and 36 staff quarters have been completed and the rest are under construction and are expected to be completed during the Third Five Year Plan period.

It has been stated that exact figures of expenditure on buildings already incurred or to be incurred by Central P.W.D. is yet to be finally known.

68. *Staff.*—The Committee are informed that against Third Plan provision of Rs. 7·01 lakhs for staff, sanction of the Government of India was received for the creation of 120* posts. The Committee are further informed that so far 103 posts have been created and 17 posts are still to be created. Against the 103 posts created 19 posts are still to be filled up. A statement showing the number of posts sanctioned, created and filled, etc. is given in Appendix V.

69. *Equipment.*—Out of a total plan provision of Rs. 1.69 lakhs for equipment a sum of Rs. 0:36 lakh only has been spent during the first three years of the Plan. It is stated that the Institute expects to utilise the remaining amount during the remaining period of Third Five Year Plan.

70. *ICAR Schemes.*—The following schemes of the Indian Council of the Agricultural Research have been taken up as part of the normal activities of the Indian Veterinary Research Institute under the Third Five Year Plan:—

1. Schemes for studying the feed requirements of sheep under range and agricultural conditions.
2. Schemes for studying the nutritional requirements of pigs.
3. Rabies research and diagnostic centre.

The Committee regret to note that there has been a shortfall to the extent of Rs. 45 *lakhs in the construction of buildings which had to be carried forward for completion from the Second to the Third Plan and that out of a total of* 25 *constructional works approved for the Third Plan period as many as* 19 *constituted the spill-over of the Second Plan. With regard to appointment of staff, the performance of the Institute is equally unsatisfactory in as much as* 17 *posts are yet to be created and* 19 *posts still remain to be filled. The Committee would stress that the execution of Plan projects which are essential for the development of the Institute should be speeded up so that these are completed within the Third Plan period itself. The Committee also suggest that detailed planning of schemes to be undertaken in the Fourth Plan period should be taken up now so that their execution is evenly spread throughout the period of the Plan and necessity of spill-over from one Plan to another Plan is obviated.*

*Originally 121 posts were created. Later sanction for posts of Heads of Divisions was cancelled and a new post of the Head of the Division was sanctioned making the total 120.

CHAPTER X—TRAINING

71. Teaching at Post-Graduate level has been a regular activity of the Indian Veterinary Research Institute since 1901. The Post-Graduate teaching at the Institute has been reorganised and augmented from time to time to meet the increased demands of the Centre and the States for trained personnel required in connection with the developing livestock industry in the country.

A. Diploma Courses

72. At present the following three Post-Graduate Diploma Courses called the National Diploma Courses are provided at the Institute:—

(i) Diploma in Preventive Veterinary Medicine.

(ii) Diploma in Poultry Husbandry.

(iii) Diploma in Animal Husbandry.

*Besides, the following two Certificate Courses are also held:

(i) Animal Gynaecology and Physio-Pathology of Reproduction.

(ii) Technique of Manufacture of Biological Products.

B. Post-Graduate College

73. For a long time the Institute has been recognised as a centre for research leading to M.Sc., Ph.D. and D.Sc. degrees of several Indian Universities. To meet the shortage of suitably qualified technical personnel in the Veterinary and Animal Husbandry field, a Post-Graduate College of Animal Science was established in 1958 at the Institute in which teaching and research are closely integrated. It is stated that the establishment of the College would also obviate the need for Indian students to go abroad for Post-Graduate studies and provide the requisite facilities for the study of problems peculiar to the country.

C. Integration of Research and Teaching

74. The Committee are informed that teaching and research at the Institute were completely integrated during 1963-64 with the main objective of providing the maximum possible facilities for research to the Post-Graduate students and for improving the standard of education. With this object in view, the Heads of Divisions of Animal Genetics, Animal Nutrition, Poultry Research, Parasitology, Pathology and Bacteriology and the Principal, Post-Graduate College were

recognised by the Agra University as Heads of their respective departments of Post-Graduate classes. In addition, 26 Research Officers and Assistant Research Officers were recognised by the Agra University as Lecturers of M.V.Sc. classes in their respective fields of specialisation.

D. Intake of Students for various courses

75. The intake of students to various courses at the Indian Veterinary Research Institute during 1961-62 to 1963-64 is indicated below:—

Name of Courses	No. of students admitted		
	1961-62	1962-63	1963-64
1. Ph.D.	7	22	21 (including ICAR & CSIR student)
2. (a) M.V. Sc. (Previous) .	22	22	46
(b) M. V. Sc. (Final) .	27	21	19
3. National Diploma in Preventive Veterinary Medicine	18	19	12
4. National Diploma in Animal Husbandry . . .	23	17	14
5. National Diploma in Poultry Husbandry . . .	17	16	20
6. Certificate Course in Animal Gynaecology and Physio-Pathology of Reproduction	17	18	12
7. Advanced Course in Technique of manufacture of biological products .	4	9	5

As regards the possibilities of admitting larger number of students to the M.V.Sc. Course, the Committee are informed that at present instruction is imparted in six subjects only. According to the existing orders 10 students per subject, *i.e.*, 60 in all, are to be admitted each year. These targets have not so far been achieved partly on account of limited hostel accommodation and partly due to the requisite number of students with good scholastic career not being available. Action is being taken for the construction of another wing in the new hostel at the Institute.

The Committee are informed that it would also not be desirable to increase the number of students in each subject beyond the aforesaid limit as it will hamper the research work of the Institute. An additional subject of Biochemistry is proposed to be added to the M.V.Sc. Course.

This will raise the total number of admissions to M.V.Sc. course by ten. It has further been stated that admissions to the M.V.Sc. course are made on the basis of merit and not State-wise.

The Committee are unhappy to note that the training facilities available at the Indian Veterinary Research Institute in various courses of veterinary science have not been utilised fully. Whereas the annual capacity of the Institute for M.V.Sc. courses is 60, *only* 22 *students were admitted in* 1961-62 *and* 1962-63 *and only* 46 *students were admitted in* 1963-64. *The Committee recommend that an Achievement Audit Committee may assess the working of the Post-Graduate College of the Institute with a view to explore the possibilities of utilising in full the training facilities available at the Institute. The Committee would recommend that all possible measures should be taken to attract adequate number of meritorious students interested in the subject to take up the courses.*

CHAPTER XI—ANIMAL DISEASES

76. Since animal diseases have been causing a serious set back to rural economy, by taking a heavy toll of livestock, year after year, the early researches of the Indian Veterinary Research Institute were concentrated on a systematic study of contagious diseases with a view to develop reliable methods for their diagnosis and control. Some of the animal diseases on which researches have been conducted by the Indian Veterinary Research Institute are given in the following paragraphs:

A. Foot & Mouth: Disease

77. The foot-and-mouth disease is a very serious disease of the cattle from the economic point of view. It has been stated that the mortality on account of the disease is low but the milk yield and the work power of the animal is affected. The loss on account of this disease is estimated to be about Rs. 4 crores annually in India.

A Foot-and-Mouth Disease Section has been in existence for several years in the Institute. The object of the Section is to evolve a cheap and efficient vaccine for prophylactic use in the field. During the earlier phases the Section perfected a crystal violet vaccine from the virus harvested from infected bovine tongues but the vaccine could not be made in large quantities at an economic cost. In the recent years the foot and-mouth disease virus strains have been successfully adapted to the chick embryo, day-old chicks, unweaned mice and adult mice. It has been stated that "type 'O' goat strain passaged through weanling mice has given encouraging results and the interesting feature is that the virus from the young mice has been successfully adapted to grow in the adult mice. This is important towards employing adult mouse as a rich source of getting a good crop of the virus for production of adequate quantities of vaccine." Tissue culture for the production of foot-and-mouth disease vaccine has been recently initiated with the assistance of the Food and Agriculture Organisation.

The Officer-in-Charge of the Foot-andMouth disease work of the Institute has been trained abroad under a Nuffield Foundation Fellowship in foot-and-mouth disease work including production of foot-and-mouth disease vaccine.

Equipment valued at $16,215·06 was ordered by the Food and Agriculture Organisation for supply to the Institute for foot-and-mouth disease vaccine production. The equipment was received in 1963 and has been recently put to use.

The Committee are informed during evidence that in view of the very great importance attached to the disease, it has been proposed to establish a separate station, independent of the Institute, during the Fourth Plan period. The location for the station will be decided after the proposal has been approved by the Planning Commission.

It has been stated that in most of the European Countries, the disease has been eradicated by wholesale killing the animals that are likely to get infected. This method cannot be adopted in India due to sentimental reasons.

The Committee note that a proposal to set-up a separate station independent of the Indian Veterinary Research Institute to intensify researches on foot-and-mouth disease during the Fourth Plan is at present under consideration of the Planning Commission. While the Committee appreciate the necessity of intensifying research on the foot-and-mouth disease, they feel that any research on this disease should be carried out under the auspices and technical supervision of the Indian Veterinary Research Institute which is the premier Institution in the country dealing with animal diseases and which has already made some progress in research in this line.

B. Tuberculosis disease of cattle

78. The studies by the Indian Veterinary Research Institute have revealed that the infection of tuberculosis in the States like the Punjab and Bombay and in certain organised herds of the country is quite high and that if timely steps to control the infection are not taken, the disease is likely to prove a serious threat to the developing livestock industry of the country.

The Institute has devised a scheme which aims at systematic control of tuberculosis in organised herds with the ultimate object of eradicating the disease from the country. This objective is sought to be achieved according to a phased programme, as given below:—

Phase I. Systematic control of tuberculosis in organised herds and its eradication.

Phase II. Extension of the control programme to cover all cattle and buffaloes in the country.

The present scheme is confined to phase I of the programme, which is based on the policy of subjecting all the animals in a heard to tuberculin test, segregation of tuberculin reactors and destruction of open and advanced cases of the diseases.

Under the Scheme the cost of production of the tuberculin will be borne entirely by the Government of India while the rest of the expenditure will be incurred by the State Governments. Fifty per cent of such expenditure will, however, be provided as plan assistance from the Centre.

The technical guidance and coordination of the work under the scheme will vest in the Indian Council of Agricultural Research.

In view of the serious threat posed by the tuberculosis disease to the developing livestock industry of the country, the Committee urge that a vigorous campaign on the lines of the Rinderpest Eradication Campaign launched by the Institute with noticeable success in 1954, *should be launched without delay for eradication of this disease, in close cooperation with the State Departments of Animal Husbandry.*

C. Haemorrhagic Septicaemia

79. Haemorrhagic Septicaemia is a highly killing bacterial disease like human plague and is responsible for the death of more than 40,000 cattle and buffaloes every year in India, inflicting a national loss of nearly 10 million of rupees per annum.

The Institute developed a highly efficacious oil-adjuvant vaccine in 1953. The vaccine has been tried on a very extensive scale and found to be absolutely safe for cattle and buffaloes of all ages. The immunity following its use has been tested so far upto 3 years and found to be solid. The newly developed vaccine is now being produced in the Division of Biological Products on a commercial scale and over a million doses of this product are produced every year. It has been stated that the State Production Centres are now gradually taking to the manufacture of this new product to replace the older less effective vaccine and the Institute is freely training the staff from the States in the technique of its manufacture.

The Committee suggest that the manufacture of oil adjuvant vaccine which has proved efficacious in controlling Haemorrhagic Septicaemia should be increasingly taken up by the States. The Committee also suggest that the Institute should provide technical know-how in the manufacture of the vaccine to the States in the initial stages. To this end the Committee suggest that the programme for training State personnel in the manufacture of this vaccine may be drawn up in consultation with State Governments.

D. Ranikhet Disease of Poultry

80. The Committee are informed that a notable contribution of the Indian Veterinary Research Institute in the field of Preventive Veterinary medicine is the successful evolution of a vaccine against the highly fatal Ranikhet disease of poultry which had at one time made rearing of poultry on a commercial scale practically impossible. The vaccine is being produced in several Production Units in the country with seed materal supplied by the Institute. This biological preparation confers life-long immunity and its cost of production is as low as one paisa per dose. The vaccine in a freeze-dried form can be supplied by post to all parts of India.

The Committee are informed during evidence that in most of the States, certain days in a week are assigned as Ranikhet vaccination day and people bring their birds for getting them vaccinated. The Director of the Indian Veterinary Research Institute stated during evidence that "Ranikhet is another disease where some sort of compaign should be taken up though it may not be on the scale of rinderpest compaign."

The Committee are happy to note the achievement of the Indian Veterinary Research Institute in regard to the evolution of the Ranikhet disease vaccine. They urge that effective steps may be taken in consultation with the State Governments to popularise the vaccine among the poultry breeders so that the disease may be eradicated to the benefit of the poultry industry.

E. **Research on Medicinal Plants for treatment of cattle diseases**

81. The Committee are informed that India imports every year a large quantity of foreign medicinal preparations for the treatment of non-contagious diseases of livestock. The Committee are further informed that there are many plants of indigenous origin with reputed medicinal properties which can be used with advantage in the day to day veterinary practice, if only, their therapeutic merits were known with a fair degree of certainty.

It is stated that a scheme for research into the indigenous drugs of India for use in veterinary practice was started at the Medical College, Madras in 1940 under the Indian Council of Agricultural Research. The scheme was terminated in 1950. During this period nine plants were investigated, six of which were suspected to be poisonous and three were thought to be of therapeutic value.

A scheme on investigations on indigenous medicinal and toxic pharmacology and therapeutic value in veterinary practice was started in the Indian Veterinary Research Institute in April, 1962. The progress of the investigations made by the Institute in this regard is given below:

(i) The seeds of *Cassia tora Linn*—a weed—has been found to be effective in the treatment of ring worm in cattle. The active principle of the seed has been isolated and identified as *Chrysopharic-acid.*

(ii) *Oil of cedar wood—Cedrus Doodara*—has been found effective against "psoroptic mange in cattle". A patent to use deodar oil in castor oil base has been applied.

(iii) Studies on three more indigenous plants, namely *veronia anthelmintica embelia ribes* and *Prusus persica* reputed to have antihelminthic properties are under study.

It is stated that the possibilities of commercial exploitation of the active principles of the above medicinal plants, which have been found

to be effective in exploratory experiments, are yet to be explored. It is also stated that Government have approved the proposal of the Institute to apply for a patent in respect of a cure for ringworm in cattle on the basis of investigations carried out on *Cassia tora* seed.

In view of the meagre information available at present on the application of the indigenous plants which are reputed to have therapeutic value in veterinary practice, the Committee would urge that researches in this direction should be intensified in the Institute and in collaboration with State research institutions.

CHAPTER XII—POULTRY RESEARCH

82. The Poultry Research Division of the Institute was established in 1939. The Division has done some useful research work relating to grading up of low production stock of Indian fowls by cocks of the foreign breed and investigation of the grading and preservation of eggs and poultry meat, canning of chickens, etc.

One of the main objects of the Poultry Research Division is to formulate the best and cheapest methods for developing economic and balanced poultry rations by utilising farm and industrial by-products as poultry feeds. The Division has made certain studies on (1) economic poultry ration, (2) productive energy of poultry ration, (3) effect of supplementation of an all-vegetable protein ration, etc. The nutritional requirements of poultry for starting chicken feed, growing chicken feed and laying chicken feed have been prepared to fix the quality specifications for poultry rations on a broad basis which will serve as useful guide to the compounded feed manufacturers and poultry keepers in the country.

Asked to indicate whether the economics of the poultry keeping have been studied by the Institute, the representative of the Ministry stated during evidence: "The main complaint at the moment is that the price of poultry feed has gone up and therefore it becomes relatively uneconomic and unprofitable". He further stated that "the Indian Council of Agricultural Research has recently set up a Committee to go into the question of poultry feed and its cost and also for finding out alternative feeding which the poultry farmer may get at a lower cost. The Committee are making investigations".

As the poultry provides a source of rich protein for improving the levels of nutrition and is also helpful in giving gainful employment to people both in rural and urban areas, the Committee would urge that researches should be intensified to evolve a cheap nutritional poultry feed so that more people can take up poultry keeping as a subsidiary occupation. The Committee feel that with cheaper feed being available, the poultry industry can make significant progress.

CHAPTER XIII—MANUFACTURE OF BIOLOGICAL PRODUCTS

83. The manufacture and supply of various biological products according to the demands of the country is the function of this Division. As many as 42 biological products for the diagnosis and control of animal diseases are manufactured by it. A rough idea of the magnitude of the activities of this Division can be had from the average annual figures of production which run into approximately 2,13,45,373 doses as per figures of last five years given below:—

Year	Total No. of doses
1958-59	287,43,874
1959-60	280,54,263
1960-61	219,18,592
1961-62	144,31,175
1962-63	135,78,963
Total	1,067,26,867

Work on the improvement and simplification of procedures of production and standardization of biological products manufactured in the Division is also carried on. It has been stated that the contribution of this Division in the control of rinderpest, african horse sickness, swine fever, haemorrhagic septicaemia and several other diseases of livestock through timely supply of potent biological products against them are noteworthy. The Division is under the charge of a Head of Division, who is responsible for the planning and supervision of the manufacture and supply of the various products.

A. Bacterial vaccine production laboratory

84. The Achievement Audit Committee (1963) were of the view that the design and size of rooms etc. especially of those meant for bacterial vaccine production which were improvised from the existing buildings was not at all suitable and conducive to production work. The Achievement Audit Committee had further observed that "these rooms will become more and more unsuitable in future when the demand for these vaccine increases and production procedures undergo a change by employing improved techniques".

The Committee are informed during evidence that the existing building was put up when the requirement for vaccine was relatively small. But with the production of as many as 42 different types of vaccines there is need for a better and more modern building.

The Committee recommend that urgent steps may be taken to provide a modern building suitable for the production of bacterial vaccines.

B. Provision of electricity and water

85. The Achievement Audit Committee (1963) had remarked that "service facilities relating to the supply of electricity, water and air-conditioning at the Institute was not very satisfactory and offer a great deal of scope for improvement. Break-downs in the electrical current which are quite frequent must be attended to immediately if proper standards of biological products issued from the Institute have to be ensured. Similarly, inadequate water supply renders work difficult".

The Estimates Committee are informed that in order to prevent frequent breakdowns in power supply and fluctuations in voltage, the Institute has suggested that a separate feeder line may be laid from the Hydel Main Sub-Station, Dhona, for supplying power exclusively to the Institute. The estimates of providing this feeder line is under preparation by the C.P.W.D. There is also a proposal to have a separate high tension line from the Institute Sub-Station, having a stepped down transformer, up to the Climatology Laboratory in order to ensure supply of steady requisite voltage. It is stated that this would incidentally also avoid fluctuations of voltage in the other distribution lines.

As frequent breakdowns in electricity supply and inadequate supply of water are apt to cause financial loss to the Institute on account of low production of biological products and also result in deterioration of the quantity and potency of biological products issued, the Committee recommend that urgent action should be taken to make available constant, steady and reliable electricity supply.

C. Review of Biological Products

86. While reviewing the work of the Division of Biological Products the Achievement Audit Committee (1963) observed that—

> "while in some of the Sections there is an increase in the demands of a number of biological products, there is on the other hand a progressive decline in certain others. This is very particularly so in the case of antirinderpest serum, production of which is going down markedly. It may similarly be necessary to reduce the production of other anti-sera."

The Committee take it that as research develops, more and more effective vaccines/antisera would be produced. They recommend that the Institute should periodically review the efficacy of as well as the demand for the biological products manufactured by the Division of Biological Products with a view to gradually stop the manufacture of those products that are out-dated and take up the manufacture of new vaccines and antisera.

CHAPTER XIV—EXTENSION ACTIVITIES

87. One of the functions of the Institute is to do extension work on a pilot basis. The representative of the Ministry stated during evidence "Most of the research work that has been completed is carried out on a pilot basis. Extension work to that extent is done. The Institute does not do any direct large-scale extension. All the research results are passed on to extension workers in the Animal Husbandry Departments who are the persons mainly concerned with the extension work. So far as extension responsibility of the Institute is concerned it would be enough if they can train extension workers for extension work so that the results of research can go to the extension workers in the State Animal Husbandry Departments who are directly responsible for extension work."

The Committee are informed that in their proposals to Government for the development of the Indian Veterinary Research Institute during the Fourth Five Year Plan, the Institute has stated as follows:—

> "It needs no emphasis that in a predominantly agricultural country like ours, where majority of population is not yet well-read and can hardly make use of the published material in order to benefit from results of research work carried out in the various aspects of animal sciences at the Institute, it is absolutely essential to provide an efficient and well co-ordinated extension service in order to establish a liaison between laboratory workers and those working in the field. Such an Extension Unit will be able to apprise the research workers of the problems of the farmers and help in the dissemination of newer knowledge to field workers. It is proposed that a new Division of Extension Service may be sanctioned under the Fourth Plan."

The Committee would like to invite attention to recommendation contained in para 13 of their 79th Report (Third Lok Sabha) on Central Potato Research Institute wherein they had suggested that a high-powered committee may be constituted urgently to go into the question of providing an effective and purposeful link between the research institutes and the farmer. The Committee note that whereas the National Dairy Research Institute conducts short courses in dairy extension, Indian Veterinary Research Institute has no course to train the extension personnel of the State Governments in the application of Veterinary researches being carried out at the Institute. The Committee consider that the Indian Veterinary Research Institute should play a key role in training the State personnel in extension methods so that the researches of the Institute are carried to the farmers and their problems are brought to the notice of the Institute for solution.

CHAPTER XV—MISCELLANEOUS

A. Regional Stations

88. The Indian Veterinary Research Institute has at present no regional station. The Institute is taking care of almost all research work in the field of animal sciences, although some research work is also being done in some of the State research laboratories. The Institute has submitted a scheme to the Government for setting up two Experimental Research Stations during the Fourth Plan period. Details of the Scheme as furnished by the Institute are as follows:

"The importance of the control of animal diseases in relation to the livestock economy needs no emphasis. To be successful, the disease control programmes must be backed by an efficient diagnostic service drawn from a complement of specifically trained and experienced personnel. The Indian Veterinary Research Institute, as a central organisation, has been making this service freely available to the different states either by carrying out on-the-spot investigation together with the specialized laboratory examination or in the way of laboratory examination and advice rendered to the veterinary disease investigation authorities in the different States. With the launching of many new livestock improvement schemes in the post-independence programmes of development, the need for a quick and expanded specialized diagnostic service has never been greater. This is all the more so, especially when we take stock of the emerging animal diseases, which were once considered alien to this country. To fulfil this objective precisely and to tackle more effectively the livestock problems akin to a particular region through a closely-knit team of specialists, an organisation of the regional research centres sounds the only practical solution.

It is proposed that to begin with, two Experimental Research Stations may be started as a part of the present scheme. One of them would serve the eastern region of the country and may be located at a suitable place in the State of Bihar say Ranchi and the other for the southern region, may be started at Hyderabad or near about. These two stations along with the collaborative service available from the Indian Veterinary Research Institute—the present organisation will markedly improve the level of the diagnostic service and research facilities and will be better able to investigate and suggest control procedures on regional diseases, which seem to have proved elusive for want of deserving attention. Besides this, the stations will provide the technical know-how to the provincial veterinary investigation authorities in their respective regions and surely, it will also provide the

necessary stimulus to the state authorities to set up livestock research stations as an important step to the improved veterinary organisation.

These experimental research stations will function as sub-stations of the Indian Veterinary Research Institute, and will have the working staff in the regional laboratory and/or in the field in the mobile laboratory (a van fitted with essential laboratory equipment for on-the-spot investigation).

The research stations will make special study of the local animal problems to be able to pay an adequate attention as to their solution. This will be a definite contribution to the economy of the animal industry of the country.

Total cost of the scheme:

	Rs.
Non-recurring	14,00,000·00
Recurring for one year	2,15,240·00
Non-recurring	
(i) Cost of land, research laboratory, small animal breeding house, animal shed, office accommodation and staff quarters etc. . . .	9,00,000·00
(ii) Equipment including the imported one and two mobile vans fitted with laboratory equipment for field investigation . .	5,00,000·00
	14,00,000·00"

The representative of the Ministry stated during evidence:

> "The Institute made this proposal, but it has not been accepted. In the meantime, the State Governments themselves feel that instead of setting up central stations they could be helped to improve their own. This is a matter still under discussion and consideration. There is no final answer to this question."

The Committee feel that there is some force in the argument that the Indian Veterinary Research Institute should be allowed to have regional experimental stations for special study of the problems peculiar to the regions where the sub-stations are to be set up. The Committee hope that Government would come to an early decision in the matter so that problems of regional nature can be effectively tackled by the Indian Veterinary Research Institute.

B. Utilisation of machinery and equipment

89. It has been stated that for various reasons, such as absence of AC power, short supply of spare parts, insufficient supervision etc., a large number of machinery and equipment which has either been procured from indigenous sources or obtained under the foreign aid programmes, is not being made full use of.

A survey of the items of equipment, which were lying unused, has been completed by the Institute recently on the recommendation of the Working Group of the Ministry of Food and Agriculture which visited the Institute in June, 1962 to make an on-the-spot examination of the major problems facing the Institute.

A statement showing the various items of equipment lying unused, their cost, date from which lying unused, steps taken for their repairs, arrangements made for the procurement of essential parts in advance and the dates from which some of the equipments have been put into use is given at Appendix VI. Some of the equipment is lying unused since 1956. The total cost of the equipments which were not used amounts to Rs. 79,543:39. Five items of equipments which cost Rs. 58.816:23 are still lying unused.

The Committee are unhappy to note that a large number of machinery and equipment remained idle for several years thus hampering the research work of the Institute. Even now some items of equipment are lying unused. The Committee would urge that immediate steps should be taken to put the idle machinery and equipment into service.

The Committee have also noted that non-utilisation of research equipment is a feature which is to be noticed in most of the Central agricultural research institutes. The Committee would urge that before the equipments are purchased, all preliminaries for the utilisation of machinery and equipment should be finalised so that there is no delay in commissioning them.

C. Animal Husbandry Statistics

90. When asked to comment on the adequacy of the statistics in regard to animal husbandry matters, the representative of the Ministry stated during evidence that the statistics are not adequate. He further stated "some statistics come from the Institute of Agricultural Research Statistics. They have carried out some surveys under various Indian Council of Agricultural Research schemes. The Marketing Directorate also collects some statistics but some of those are not really dependable. The statistical wing in the Ministry carries out a census of livestock once in every five years. We have information on that." It is stated that Central Government have advised all the State Governments to set up a statistical cell in their Animal Husbandry Department, for collection of data in regard to animal husbandry matters. The

States have set up small cells and in the Fourth Plan, these cells would be further strengthened.

The Committee cannot too strongly stress the need for collection of reliable statistics in regard to the animal husbandry matters as successful planning for research depends on accurate and up-to-date statistics. The Committee suggest that Indian Council of Agricultural Research which has under it the Institute of Agricultural Research Statistics should be entrusted with collecting and collating statistics on animal husbandry matters in close collaboration with State Governments.

D. Maintenance of Research Records

91. Prior to 1940 when the main research activities of the Institute were located at Mukteswar, there was a Central Unit for maintaining files in respect of each research project. The Committee are given to understand that with the expansion in the activities of the Institute at Izatnagar resulting in the establishment of several new Divisions, this Central Unit was closed under the orders of the then Director. Records of research work conducted in the various Divisions have since been maintained by individual workers.

The Achievement Audit Committee (1963) during the course of the review of the work of Pathology and Bacteriology Division observed as follows:—

> "In the past there was a system for the maintenance and recording of original research records. When a particular investigation is started a file is opened and all manuscript records are placed seriatim in it and when the work is written up, the whole manuscript is sent to the Research record office for proper maintenance. The Committee recommends that this system should be revised."

In evidence, the Director of the Institute informed the Committee as follows:

> "At one time, all the research work done by us was recorded. Later on, sometime about 10 years ago, the then Director thought that it was not necessary to record them because the research work which was of practical utility was published in the form of scientific articles. It was found not necessary to publish all the work. But, to maintain the continuity of work, it is necessary to record these things. Hence it has been introduced."

In a written note furnished to the Committee, the Ministry have stated:

> "It has been decided now that all research work carried out in various Divisions of the Institute will be on a project basis and complete records of all research work done in

respect to each project shall be maintained in a separate file, which will be properly indexed and recorded in the Division concerned."

The Committee are unhappy to note that the project files of the Institute were not being properly maintained in the past. While appreciating the recent measures taken to improve the maintenance and recording of original research records, the Committee would like to suggest that a uniform procedure for maintaining records of original research in all the research institutes under the Ministry of Food and Agriculture may be evolved after a comparative study of the system followed in the research laboratories under the Council of Scientific and Industrial Research.

E. Annual Reports

92. The Study Group of the Ministry of Food and Agriculture which made an on-the-spot examination of the major problems facing the Institute in 1962 observed as follows in regard to the preparation of Annual Reports:

"The annual reports of the Indian Veterinary Research Institute are available upto 1959-60. The report for 1960-61 is reported to be under print, while that for 1961-62 is under preparation. The Director, Indian Veterinary Research Institute was requested to follow in future a time-schedule so that the report of a particular financial year was published latest by the end of the next financial year."

The Study Group of the Estimates Committee which visited the Indian Veterinary Research Institute in October, 1964 noted that the Institute had published no annual reports after the Report of 1959-60.

In a written reply, the Indian Veterinary Research Institute has stated as follows:

"As a result of the emergency following the Chinese aggression on India, orders were issued by the Government of India, *vide* Cabinet Secretariat Memo. No. 31/6/62, dated 8th November, 1962 that in order to economise the use of paper the existing publications be either suspended or their size reduced considerably. In the case of the Annual Reports, it was desired that the size be reduced to that of the summaries and be restricted to 10 pages. The Scientific Reports of the various Divisions of the Institute, which are sent to the Indian Council of Agricultural Research each year by the end of July, contain the record of research work done at the Institute. The Annual Reports of the Institute meant for publication are an abridged form of the Scientific Reports, and are

themselves very much reduced in size. If they were further reduced to 10 pages only, they would not have served much useful purpose. Therefore, the Annual Reports were not published specially as the Scientific Reports had already been sent to the Indian Council of Agricultural Research according to the prescribed schedule."

The representative of the Ministry of Food and Agriculture (Department of Agriculture) informed the Committee during evidence that "there is some delay in getting reports of different sections and wings and that delay led to delay in compilation."

The Committee regret to note that the publication of Annual Reports which contain an authentic record of Institute's activities should have been discontinued on grounds of economy. The Committee recommend that Annual Reports of the Indian Veterinary Research Institute should be regularly published in time and supplied to the State Governments and concerned institutions to keep them informed about the work that is being done by the Institute.

CHAPTER XVI—CONCLUSION

93. The Indian Veterinary Research Institute, which is the premier institution dealing with animal diseases, besides making useful contribution to research on animal genetics and animal nutrition, has played a significant role in controlling the animal diseases.

94. *Rinderpest Disease.*—The Committee are happy to note that with the evolution of rinderpest goat tissue vaccine by the Institute and with the successful launching of Rinderpest Eradication Campaign involving as many as 230 million cows and buffaloes, it has now become possible to completely eradicate the disease which at one time was so widespread and was causing heavy mortality in the cattle.

95. *African Horse Sickness.*—The Committee are glad to note that African Horse Sickness which was reported in India for the first time in April, 1960 and was responsible for heavy mortality among the horses has now been brought under effective control mainly due to the large scale vaccination of equine population with about 8 lakh doses of vaccine prepared by the Institute at a very short notice from the imported strain of virus.

The Committee hope that educative propaganda in regard to the importance of prevention and of prophylactic measures to be taken against the spread of infection and outbreaks of seasonal diseases will be carried out effectively in conjunction with the State Governments.

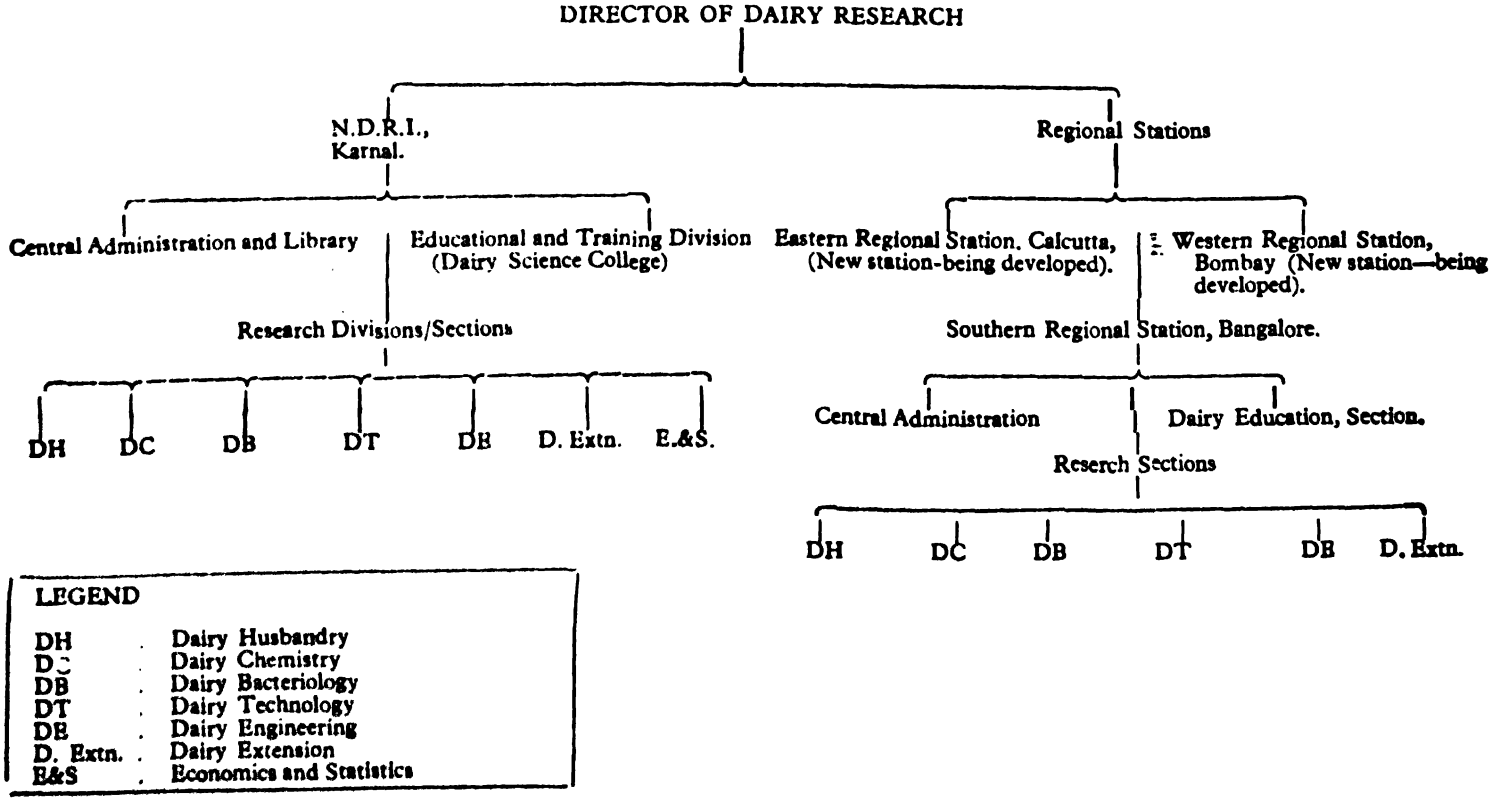
NEW DELHI;
April 23, 1965.
Vaisakha 3, 1887 (*Saka*).

ARUN CHANDRA GUHA,
Chairman,
Estimates Committee.

APPENDIX I

(*Vide* para 5)

Organisational set-up of National Dairy Research Institute, Karnal and its Regional Stations at Bangalore, Bombay, Calcutta.



APPENDIX II

(*Vide* para 36)

PROGRESS OF TRAINING OF DAIRY PERSONNEL

Name of the Institute	Name of the Course	Year of commencement/ and No. of seats available.	Year	No. admitted every year	No. passed out every year
1	2	3	4	5	6
National Dairy Research Institute, Karnal (Pb.)	M.Sc. (Dairying) (2 years course)	1961/20	1961	17	—
			1962	25	—
			1963	25	14
			1964	20	24
	B.Sc. (Dairying) Dairy Technology (3½ years course)	1957/20	1957	21	—
			1958	16	—
			1959	20	—
			1960	16	17
			1961	16	22
			1962	24	18
			1963	21	16
			1964	17	—
	B.Sc. in Dairying (Dairy Husbandry) (4 years course)	1961/12	1961	7	—
			1962	8	—
			1963	11	—
			1964	4	—
	I.D.D. (Dairy Tech.) (2 years duration)	1961/12	1961	8	—
			1962	12	—
			1963	12	8
			1964	13	10
	Dairy Extension Course (3 months duration)	1962/20	1962	6	6
			1963	18	17
			1964	12	—
	Diploma course in Dairy Engineering (9 months duration)	1962/15	1962	13	12
			1963	5	5
			1964	—	—
Southern Regional Station of the NDRI, Bangalore.	I.D.D.	1923/35	1960	38	—
	I.D.D. (Dairy Tech.)	1961/20	1961	16	—
			1962	16	35
			1963	6	16
			1964	11	14

1	2	3	4	5	6
	I.D.D. (Dairy Husb.)	1961/15	1961	14	—
			1962	18	—
			1963	25	15
			1964	23	16
Dairy Science College, Institute of Agriculture, Anand.	I.D.D. (Dairy Tech.)	1960/25	1960	24	—
			1961	18	—
			1962	14	19
			1963	22	16
			1964	20	7
Dairy Tech. Institute Aarey Milk Colony, Bombay.	I.D.D. (Dairy ech.)	1960/30	1960	30	—
			1961	35	—
			1962	17	24
			1963	32	33
			1964	21	14
Allahabad Agricultural Institute, Allahabad.	I.D.D. (Dairy Husb.)	1923/25	1960	30	—
			1961	11	—
			1962	13	28
			1963	12	11
			1964	14	13
State Institute of Animal Husbandry & Dairying, Haringhata, West Bengal.	I.D.D. (Dairy Tech.)	1963/20	1963	8	—
			1964	10	—
	I.D.D. (Dairy Husb.)	1963/10	1963	5	—
			1964	10	—

APPENDIX III

(*Vide* Para 50)

Research Programmes of the N.D.R.I., Karnal, and Southern Regional Station, Bangalore.

Suggestions of Dairy Research Advisory Committee

I. *General*:

(1) The Research Coordination Committee has been doing useful work and it may continue to function. Reports of the meetings of this Committee may be supplied to the members of the Dairy Research Advisory Committee for their information.

(2) Reports of the programme of the research work in each Division/Section may be sent to the members of the Dairy Research Advisory Committee by mid-May/October each year; the former covering the period April—September and the latter covering the period October—March. The report should *inter alia* give the details of the research work done and indicate the results obtained. A note on the contributions made towards extension work may also be attached to its report by each Division/Section.

(3) A consolidated list of papers prepared for publication/sent for publication/published during the periods April—September and October—March may also be sent to the members of the DRAG along with the reports at (1) above.

(4) The papers so far published by the Institute may be examined by the Divisions of the Institute and popular pamphlets and handouts prepared by them based on the results of such of the researches as would be beneficial to the functionaries of the dairy industry.

(5) The research activities of the Divisions of Dairy Technology and Dairy Engineering at the NDRI, Karnal, may be expanded utilising fully the facilities already available. Research work on dairy engineering has not so far been undertaken by the Engg. Section at the SRS, Bangalore, because of inadequate staff. A research officer may be provided for taking up research work and the work of maintenance may be placed in the charge of an Assistant Dairy Engineer.

II. *N.D.R.I., Karnal*:

(1) Dairy Husbandry Division:

(a) *Problems to be dropped*:

(i) Haemotological studies in Indian breeds of cattle.

(ii) Variations of body temperature in pregnancy.

(iii) Studies on evolving a method of pregnancy diagnosis at early stage in cattle.

(iv) Estogenic studies on fodders.

(b) *Modification in the problems in hand*:

(i) Cross-breeding experiments with Zebu cattle experimental work on cross-breed and Sahiwal and Red Sindhi cows with Brown Swiss bulls may be restricted to the existing programme. This programme may be put on selective basis so that the desirable and undesirable characters can be clearly stated, say, at the end of five years. Analysis of the recorded data of the existing herds may be supplied early.

(ii) Blood group in Indian cattle—Immunilogical aspects on continuous sterility may receive priority in this work.

(iii) Effect of climatological variations of physiological reactions in Tharparkar cattle—This work may be co-ordinated with similar work in progress at Izatnagar, Harringhatta and Anand with particular emphasis on the milk production aspect.

(iv) Development of a sair evaluation method for Indian farm conditions—the scope of this study may be extended to include animals in the rural areas.

(c) *New Problems*:

(i) Cross-breeding amongst indigenous breeds to evolve new dairy breeds (herds of indigenous breeds will need to be strengthened for this work).

(ii) Studies on cropping patterns in relation to the feed requirements of dairy animals.

(iii) Studies on lactational physiology of cattle—

(a) let down of milk; and

(b) weaning of buffalo calves.

(2) *Dairy Chemistry Division*:

(a) *Problems to be dropped*:

(i) Detection of cow and buffalo milk based on carotene content.

(ii) Identification of Anato colour.

(b) *Modification in the problems in hand*:

(i) Nutritive value of toned milk as compared to cow and buffalo milk—This study may be extended to the feeding of animals.

(ii) 'Brisk' test for estimation of fat in milk and milk products. This test may be extended to the field for early adoption by the dairies.

(c) *New Problems*:

(i) Classification of analysis and interpretation of the data collected by the Institute in the quality control work done.

(ii) Simplification of the Phytosterol acetate test and other tests for differentiating ghee from animal body fats.

(3) *Dairy Microbiology Divisions*:

(i) Antifungal agents for cold rooms storing milk, butter and cheese.

(ii) Bacteriological studies on packaged milk products to prevent their deterioration.

(iii) Bacteriological studies on plant sanitation.

(4) *Dairy Technology Division*:

(i) Estimation of losses in the processing and handling of milk and manufacture of milk products.

(ii) Manufacture of evaporated milk from cow and buffalo milks.

(5) *Dairy Engineering Division*:

(a) *New Problems*:

(i) Preparation of model layouts for small, medium and large milk chilling stations and dairies.

(ii) Estimations of the requirements of electricity, water, steam and fuel, refrigeration and effluent discharge for the chilling stations and dairies at (i) above.

(6) *Dairy Extension Division*:

A programme for the improvement of audiovisual aids like preparation of standard flannelograms for the dairy industry may be undertaken.

(7) *Dairy Statistics and Economics Section*:

(i) Studies on the costs of handling milk at different stages between production and distribution in small, medium and large size dairies.

(ii) Studies on the costs of roller powder, spray powder, butter and ghee manufactured in the dairy plants.

III. *Southern Regional Station, Bangalore.*

(1) *Agricultural Section*:

(i) Evaluation of phosphate deficiency in soil and remedies thereof in cultivating lucerne.

(ii) Economics of fodder production under sewage irrigation.

(iii) Nutrient requirements of different fodders.

(iv) Experiments on fodder production in Key Village areas.

(2) *Cattle Section*:

(i) Analysis of the data so far obtained on cross-breeding with exotic blood, examination of the data in the context of the problems faced by the farmers with cross-breed cattle and conclusions therefrom.

(ii) Continuation of experimental work on cross-breeding of Sindhi-Jersey. Concluding work on cross-breeding between Tharparkar and Jersey when the required number of crosses for statistical study are obtained. Discontinuence of cross-breeding with Russian bulls which has not shown appreciable improvement in milk production.

(iii) Cross-breeding amongst indigenous breeds like Halikar, Ongole, Kangyam and Krishna Valley.

(iv) Analysis of the data so far obtained on dry periods in indigenous breeds and conclusions therefrom.

(v) Analysis of the data so far collected under the Central Semen Artificial Insemination Scheme and conclusions therefrom.

(vi) Evaluation of the efficiency of different semen dilutors.

(vii) Studies on frozen semen.

(viii) Fertility in different breeds of cattle—collection and analysis of available data.

(3) *Animal Nutrition Section*:

Hadenadological studies to assess nutritional deficiencies in different parts of the Southern Region.

N.B. Nutritional studies by this Section may be confined to the breeds types of animals obtainable in the region.

(4) *Bacteriology Section*:

(i) Application of the dye reduction and other tests in the working of the Bangalore Dairy Project of Mysore Government.

(ii) Bacteriological studies in the manufacture of evaporated milk.

(5) *Dairy Chemistry Section*:

(i) Study of the protein picture of milk by the electrophotetic methods.

(ii) Study of the conductivity of milk at different frequencies to devolve a test for detecting adulteration with water.

(iii) Electrometric titration for the determination of SNF and protein in milk.

(iv) Study of the instability of cow and buffalo milk (in collaboration with DS and DT Sections).

(v) Rapid estimation of minerals and protein in milk by electrometric titration with EDTA reagent.

(vi) Standardisation of methods for the estimation of protein, chloride and lactose in milk with EDTA reagent.

(vii) Application of the method evolved for rapid estimation of SNF in milk under field conditions (the apparatus designed at the SRS may be supplied to 3 or 4 plants for conducting trials.

(6) *D.T. Section*:

(i) Studies in the manufacture of evaporated milk.

(ii) Studies in the manufacture of cheese from buffalo milk and mixed milk.

N.B. Work on dairy engineering aspects may be excluded from the programme of this Section.

(7) *Dairy Engineering Section*:

(i) Specification for floors and drains of diaries.

(ii) Manufacture of Khoa (continuous process).

APPENDIX IV

(*Vide* Para 64)

Achievements of various Research Divisions of the Indian Veterinary Research Institute

I. *Division of Bacteriology & Virology and Division of Pathology*

(i) *Rinderpest.*—This fell disease at one time was so wide-spread that by causing heavy mortality in cattle and buffaloes, it used to paralyse year after year the agricultural operations in large areas of our country. In 1860's it was killing annually about 10 lakhs of cattle.

As a result of the researches carried out at the Indian Veterinary Research Institute several methods for the control of this disease were developed from time to time which helped in reducing the losses due to this scourge.

(ii) *Anti-rinderpest Serum.*—Production of anti-rinderpest serum and the development of the serum simultaneous method of vaccination for prophylactic treatment of livestock, which are now replaced by more effective methods of control of rinderpest were the outstanding contribution of early times in the history of rinderpest work in India.

(iii) *Ranikhet Disease of Poultry.*—Another notable contribution of the Indian Veterinary Research Institute in the field of Preventive Veterinary Medicine was the successful evolution of a vaccine against this highly fatal disease of Poultry, which had at one time made rearing of poultry on a commercial scale practically impossible. The vaccine was further developed in a freeze-dried form and its large scale production was initiated in several states in India. The vaccine is now being produced in several Production Units of our country with the seed material supplied by this Institute. This biological confers life-long immunity and its cost of production is as low as one paisa per dose.

(iv) *African Horse Sickness.*—This very serious disease of equines which was reported for the first time in India in April 1960, has been responsible for heavy mortality among horses in our country. However, due to the large scale vaccination of equine population of the country with about 8 lakhs doses of the vaccine prepared in the Division of Biological Products at a very short notice from the imported strain(s) of virus, it has become possible to bring the disease under effective control within a very short period. The achievement could be exemplified by the fact that the disease which took a toll of about

28,000 equines during 1960-62, is not reported to be causing any mortality at present.

In addition to the above, very useful research work on several important infectious diseases of animals involving the study of their aetiological agents, and development of suitable diagnostic tests and biologicals for their control have been carried out. A particular mention may be made of the studies on brucellosis, mastitis, John's disease, blackquarter, anthrax, listeriosis, foot-and-mouth disease, rabies, fowl spirochaetosis, infectious coryza of poultry. Further, the aetiology of a number of obscure diseases of animals, such as bursati, equine lichen tropicus, nasal granuloma, hepatic cirrhosis in equines, bovine endemic haematuria the so-called cases of oesteomalacia or rheumatic arthritis, established to be due to excessive intake of fluorides in water and feeds in cattle, has been elucidated and their pathology and pathogenesis has been studied. It will be seen from the above that the research work carried out in the field of veterinary pathology and bacteriology has been of immense practical utility and has contributed materially to the control of animal diseases and to the development of the livestock upon which the agricultural economy of the country mainly rests.

II. *Division of Parasitology*

The researches carried out in the Division have not been merely of an adaptative or confirmatory nature but have broken entirely new ground. They have resulted in substantial original contribution to knowledge on different aspects of parasitology. A large number of new or previously unrecorded parasites of animals of economic importance have been discovered; the causes of several important diseases of unknown origin have been elucidated; the life histories and mode of spread of a number of parasites have been worked out; the histopathology of several parasitic conditions has been studied; different aspects of host-parasite relationships have been investigated; and methods for the control of a number of important parasites have been formulated and tested.

III. *Division of Animal Nutrition*

(i) *Balanced Rations for Livestock.*—In order to evolve balanced rations, the nutritive values of all the important Indian cattle feeds have been determined and the results have been published in the form of a Bulletin.

(ii) *Famine Fodders.*—Sixteen species of fodder trees like Sandan, Gauj, Marur Falk, Banj, Pipal, Gular, Kachnar, Bans, Tut, Bel and Jharberi, have been recommended for afforestation so as to be useful as cattle fodders.

(iii) *New Mineral Mixture.*—As a result of extensive survey of mineral deficiency in livestock, throughout the country, a suitable

mixture containing the required major minerals and trace minerals has been patented and released free of cost so as to be available at a cheap price for feeding livestock for their optimum work and production and for protecting them from any mineral deficiency.

IV. *Division of Poultry Research*

(i) *Upgrading of Indian Poultry.*—The results of breeding experiments have revealed that the grading up of low production stock of Indian Fowls by cocks of the foreign breeds, such as White Leghorn, Rhode Island Red and Barred Plymouth Rock, is an easy, cheap and the quickest method of large scale improvement of ordinary farm flock as regards the egg production and egg size.

(ii) *Breeding of Ducks without elaborate arrangements for water.*—Experiments have revealed that it is possible to rear ducks without making elaborate arrangements for water. Spraying of duck hatching eggs with hot water (38°C) twice daily during the third week of incubation has been found to result in improved hatchability.

(iii) *Determination of digestibility co-efficients of poultry feeds.*—A valuable contribution to the science of poultry nutrition has been made by standardising a method for determining the digestibility co-efficient and biological values of protein in poultry rations. The methods has proved very useful for the determination of the nutritive value of common Indian feeds for the formulation of economic rations for poultry.

(iv) *The Indian Standard Specification for Poultry Feeds.*—The nutritional requirements of poultry for starting chicken feed, growing chicken feed and laying chicken feed have been prepared to fix the quality specifications for poultry rations on a broad basis which will serve as useful guide to the compounded feed manufactures and poultry keepers in the country. This standard for the poultry ration is essentially a performance standard as it includes both the chemical and biological tests.

V. *Division of Animal Genetics*

(i) *Artificial Insemination.*—In India attention to artificial insemination was first focussed in the year 1942 as it provided a means of overcoming our problem of paucity of quality sires, and as an effective and quicker method for bringing about rapid improvement of livestock, through breeding. The researches carried out by the Division enabled the technique to be accepted as a normal method of breeding and thereby laid the foundation of quicker development of livestock on right lines.

(ii) *Animal Gynaecology.*—With the introduction of artificial insemination work in the country on an experimental basis in 1944, necessity of initiation of research in physiopathology of reproduction

was greatly felt. No information was available on various reproductive physiological processes. A team of workers went round the different cattle breeding farms in the country (including parts now in Pakistan) and have collected valuable data.

(iii) *Sterilisation of scrub cows.*—Induction of sterility in scrub cows is a problem of major importance in livestock development work in India. Attempts to sterilise cows with administration of massive doses of P.M.S., thermocaulary of *os uterus*, intrauterine administration of plaster of paris solution, intraovarian injection of Lugol and formaldehyde did not give satisfactory results. A modified stainless steel spring was inserted in each cornua of uterus in six cows. In all 176 oestruses were observed in these animals. None of them became pregnant though they were inseminated at all the oestruses subsequent to treatment.

APPENDIX V

(*Vide* Para 68)

Statement showing number of posts created, filled etc. under the Third Plan Provision

Sl. No.	Particulars of posts	No. of posts sanctioned by the Govt. of India	No. of posts created and filled	No. of posts created but not yet filled	No. of posts to be created	Remarks
1	2	3	4	5	6	7
1.	Heads of Divisions	2	1	..	..	*Sanction for the two posts was later cancelled and a new post of the Head of Division was sanctioned.
	CLASS I					
2.	Research Officers .	3	..	2	1	
3.	Liaison Officer	1	..	..	1	
	CLASS II					
4.	Asstt. Res. Officers .	6	3	2	1	
5.	Estate Manager . .	1	1	..	..	
6.	Electrical Engineer .	1	1	..	..	
7.	Veterinary Officer	1	1	..	..	
8.	Asstt. Admn. Officer	1	1	..	..	
	CLASS III					
9.	Office Supdts. . .	6	6	..	..	
10.	Head Clerk . .	1	1	..	..	

1	2	3	4	5	6	7
11.	Contract Assistant	1	1	..	..	
12.	Office Assistants	7	7	..	..	
13.	Accountant	1	1	..	..	
14.	Upper Division Clerks	17	15	2	..	
15.	Lower Division Clerks	11	9	1	1	
16.	Steno typists	3	2	..	1	
17.	Hindi Typist	1	..	1	..	
18.	Assistant Cashier	1	..	1	..	
19.	Driver	1	..	1	..	
20.	Workshop Assistant	1	..	..	1	
21.	Field Assistant	1	..	..	1	
22.	Watch and Ward Asstt.	1	..	..	1	
23.	Stochman Compounder	1	..	1	..	
24.	Research Assistants	7	2	3	2	
25.	Laboratory Assistants	2	1	..	1	
26.	Stenographers	8	6	2	..	
	CLASS IV					
27.	Boiler Attendant	1	..	..	1	
28.	Gestetner Operator	1	1	..	..	
29.	Daftri	1	1	..	..	
30.	Farm Assistant	1	..	1	..	
31.	Chowkidars	8	8	..	..	
32.	Chaffcutter Driver	1	1	..	..	
33.	Library Attendant	1	..	..	1	
34.	Head Packer	1	..	1	..	
35.	Peon	1	..	..	1	
36.	Laboratory Attendants	18	14	1	3	
		121	84	19	17	

APPENDIX VI

(*Vide* para 89)

Statement showing the equipments of the I.V.R.I. lying unused.

I—FOREIGN EQUIPMENT WHICH WERE LYING UNUSED

Sl. No.	Name of Equipment	Quantity/ number	Cost Rs.	Length of period for which it was lying unused	Reasons for its lying unused	Remarks
1	2	3	4	5	6	7
			Rs.			
1	Autoclave (Vertical 220 V AC/DC).	One	1,795·00	Since 1960	Though in working order, it could not be used for want of a suitable power point in the laboratory of its working.	The newly constructed building is complete and the equipment will be put into operation as soon as the laboratory is properly fitted and occupied by the Officer concerned.
2	Incubator wet-type (POV-83)	One	6,068·21	Since reciept in 1959.	For want of step down transformer.	In use since June, 1964.
3	Haemometer	One	105·16	Since receipt in 1958.	It was received out of order and its photo cell had to be procured.	Do.

1	2	3	4	5	6	7
			Rs.			
4	Balance direct reading Platform.	One	816·43	Since receipt in 1958.	Its spring was found broken on receipt and another spring for its replacement was to be obtained from the T.C.M.	In use since June, 1964.
5	Memometer gauge	Two	573·60	Do.	It was received in broken condition and needed repairs.	Do.
6	pH meter	Four	11368·76	One since receipt in 1960 and three since 1963.	The batteries had exhausted and needed replacement. High voltage dry batteries could not be procured.	Action to procure batteries was pursued vigorously. Except high voltage batteries, others have been obtained.
		TOTAL	20,727·16			

II—FOREIGN EQUIPMENT LYING IDLE

Sl. No.	Name of the equipment	Cost (Rs.)	Period for which lying idle	Arrangements made to put in use	Arrangements made to procure essential parts in advance and keep them in stock.
1	2	3	4	5	6
1	Stockes Freeze Drying Unit with steppering device and/ vacuum gauge.	24,363·66	Since its receipt in May-June, 1956.	It was received in a much damaged condition. Efforts were all along being made to explore the possibilities of getting the replacement parts through T.C.M. The T.C.M. authorities actually inspected the equipment. Their efforts in obtaining the spare parts having at last failed, provision for requisite foreign exchange required for their procurement has been made in the foreign exchange budget proposals for the period Oct. 64 to Sept., 65.	Spare parts were receivecd alongwith each item of equipment but they were only small items meant for repairs arising from normal wear and tear. The damage was so expensive and the parts which were damaged were such as were not available among the spares received with the original consignments because the parts damaged are normally not expected to be replaced as a result of normal wear and tear.
2	Torsion Blanace	836·50	Since its receipt in June, 1959.	Do.	Efforts were made to obtain the required parts through the

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					good offices of the T.C.M. but without avail. Action is now being taken to get foreign exchange released for the purpose.
3	Incubator Precision	261·23	Since 1962 (the equipment was received and commissioned in 1958 but went out of order in 1962)	Efforts were made to procure the bimetallic thermostat from indigenous sources but to no avail. The item has therefore been included in the forecast of foreign stores to be procured from U.S.A. during 1965-66.	
4	Autoclave	16,677·42	Since its receipt in 1958.	It was received in a much damaged condition. Efforts to get the replacement parts in India have not met with success so far. The parts will therefore be obtained from abroad.	
5	Autoclave	16,6777·42	Do.	This equipment was obtained for use at Mukteswar on the availability of A.C. current there, proposal for which had been initiated prior to the ordering of the equipment. Sub-	

TOTAL	58,816·23
GRAND TOTAL	79,543·39

sequently the Pathology Division has been transferred from Mukteswar to Izatnagar and the equipment will be put in use as soon as a special cable has been laid up to the laboratory. The equipment, however, is in working order.

APPENDIX VII

Statement showing the Summary of Conclusions/Recommendations contained in the Report

Sl. No.	Reference to Para No. of the Report	Summary of Recommendations/Conclusions
1	2	3
1	8	The Committee understand that the main reason in the shortfall in the utilisation of the Second Plan provision is the delay in the establishment of two new regional stations, viz. Western Regional Station and the Eastern Regional Station. The Western Regional Station was established in June, 1962 while the Eastern Regional Station has been established as late as February, 1964. The Committee see no reason why with advance planning it should not have been possible for the Institute to utilise the entire amount of plan provision during the Second Plan period itself. The Committee recommend that the spill-over of projects from one Plan to another Plan should be avoided as far as possible.
2	9	The Committee note that about Rs. 100 lakhs only out of the total provision of Rs. 150 lakhs are likely to be utilised by the end of the fourth year of the Third Plan, thus leaving about one-third of the provision to be utilised in the last year of the Plan. The Committee are doubtful if the Institute would be able to utilise this amount fully. They apprehend that like the Second Plan the projects envisaged in the Third Plan will spill-over to the next Plan period. The Committee stress that every effort should be made to avoid recurrence of such delays in putting the projects in operation in the Fourth Plan. They would suggest that a properly phased programme may be prepared in advance for implementation during the next Plan period.

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3	13	In view of the fact that the present production of milk falls short of even half of the optimum requirements for a balanced diet, the Committee strongly feel that there is need for a crash programme for cattle and dairy development which will have a substantial impact on milk production so that the minimum requirement of 6 oz. of milk per capita may be achieved within the next plan period.
4	21	(i) The Committee consider that the grading up of cow and thereby raising the milk yield is a necessary and major task. The Committee need hardly stress that this task should be dealt with on a coordinated and concerted basis, with the help of the resources of State Government Farms and Military Dairy Farms as these farms can help for evolving a type of cattle useful under Indian tropical conditions. The Committee would suggest that Government may actively consider the question of augmenting the breeding facilities at the existing Central and State Government Farms and of increasing the number of these farms. At the same time the researches so far made by the National Dairy Research Institute and Indian Veterinary Research Institute in evolving better breeds should be widely publicised and popularised among the people. (ii) The Committee further suggest that in the development programmes of cattle breeding, greater attention should be given also to the upgrading of the buffalo which is the principal dairy animal in many parts of the country.
5	24	The Committee consider that the introduction of artificial insemination technique has opened up tremendous possibilities of rapidly improving the milking quality of vast number of Indian cows and buffaloes scattered in different parts of the country. The Committee recommend that this technique should be popularised on wider scale amongst the farmers for grading up village cattle. As the modern trend is to use semen of pedigree bulls for

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		upgrading the cattle, the Committee also suggest that each intensive cattle development area and key development block may be provided with a major artificial insemination unit as early as possible.
6	30	(i) The Committee note that with the over-increasing emphasis on food production considerable portions of land and other natural resources have been increasingly diverted from grazing lands for raising food crops accentuating the already critical situation of animal nutrition in the country. In this context, the Committee would like to lay emphasis on the researches being carried out at the National Dairy Research Institute, Central Arid Zone Research Institute, Indian Grassland and Fodder Research Institute, as well as various Soil Conservation Research, Demonstration and Training Centres in developing those grasses which will grow all the year round with less irrigation and fertilizer facilities. The Committee consider that an intensive programme for introducing such grasses in the dry lands and arid zones, if launched on a priority basis in cooperation with State Governments, will not only meet the growing demands of cattle feed and fodder to a great extent but also help in maintenance of soil fertility and soil conservation. (ii) The Committee would also like to invite attention to para 20 of their Eightieth Report on Indian Grassland and Fodder Research Institute wherein they have suggested that there should be close and intimate coordination between the various research institutes already engaged in the task of developing suitable grasses and fodder for dairy animals and the newly established Indian Grassland and Fodder Research Institute so as to avoid overlapping and duplication of work and to intensify research on the more promising projects.
7	31	The Committee recommend that the cheap and balanced rations evolved by the Indian Veterinary Research Institute should be widely disseminated

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		to the dairies and farmers so that the cost of feeds and milk production is brought down in the country. The Committee would further suggest that the data on the mineral mixtures should be passed on to all the cattle feed milling plants and further research in this regard be done in close liaison with these mills.
8	35	It is now widely recognised that weeding of inferior stock of cattle is necessary complement to any systematic programme for improvement of cattle breeding. In view of the tremendous scarcity of green fodder and concentrates required by the rising cattle population and the meagre chance of getting any additional land for growing fodder crops, the Committee consider that all-out efforts are required to be made to reduce the inferior/dry stock of cattle or at any rate effectively check their multiplication. The Committee suggest that Government may use their information and extension agencies for focussing light on these central facts so as to overcome any popular prejudice which may be impeding the adoption of scientific measures to achieve this end.
9	38	The Committee are glad to note that the National Dairy Research Institute organised tutorial workshops for the benefit of dairy teachers from various dairy training centres of the country. The Committee suggest that tutorial workshops may be held at suitable intervals so that dairy teachers are brought in direct contact with the National Institute. This would not only make for improvement in standards but also bring about desirable uniformity in dairy teaching.
10	42	The Committee would suggest that hostel facilities should be suitably augmented so as to ensure that teaching capacity in the Institute is fully utilised. In this connection, the Committee would like to draw attention of the Government to the design of newly constructed hostel at the

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		National Dairy Research Institute, Karnal. The Study Group of the Estimates Committee which visited the Institute in October, 1964 were not quite happy about its design from the utility point of view. The Committee hope that Government would see to it that the second hostel at least will have a better design.
11	43	The Committee feel distressed to note that notwithstanding the marked shortage of training facilities as compared to the demand, even the existing capacity in the National Dairy Research Institute for B.Sc. and Dairy Engineering courses is not being fully utilised. In fact, the utilisation of the capacity of B. Sc. courses in 1964 has come down to 66% as compared to the preceding year and the utilisation of the capacity for Dairy Engineering course in 1963 was only 33% while figures for 1964 have not been furnished. As this non-utilisation of training facilities constitutes national wastage the Committee would urge that all possible measures should be taken to attract adequate number of meritorious students interested in the subject to take up the courses.
12	44	The Committee consider that if the dairy projects in the Fourth Plan are to be executed according to target it is imperative that the shortages in the dairy personnel should be made good as expeditiously as possible. The Committee feel that the Board of Dairy Education which was constituted by Government in 1961 with the Director, National Dairy Research Institute as Chairman should give serious consideration to this matter and draw up a concerted plan of training in consultation with State Governments.
13	46	The Committee are unhappy to note that although the nucleus of dairy extension was a part of the National Dairy Research Institute Project which was approved by the Expenditure Finance Committee (Ministry of Food and Agriculture) as far back as July, 1956, the formal sanction therefor was accorded only in May, 1961 and it was

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		actually brought into being only towards the end of 1962. Besides, till this date the Division of Extension is neither fully equipped nor properly manned. That this has adversely affected the training of extension personnel is evident from the fact that the Institute has so far (end of 1964) trained only 36 trainees in about 3 years whereas it was planned to train 100 trainees annually. The Committee are distressed to note the poor performance of the Institute in regard to the training of extension personnel and urge that prompt and energetic steps may be taken to equip the Institute and its regional stations with proper facilities for extension work.
14	47	(i) The Committee welcome the practice of having regular meetings of research workers with the representatives of the industry, trade and farming community so that the research may be of greater benefit. (ii) The Committee would further suggest that each Regional Station of the National Dairy Research Institute may convene a meeting annually of the dairy technical personnel to acquaint them with the programmes and progress of the research and extension activities of the Stations and exchange ideas with them on any problems which need attention of the Station.
15	48	The Committee feel that any extension programme which does not enlist the assistance of the relevant Government departments and other concerned organisations, in educating the rural milk producers in the new techniques is not likely to bear fruit. The Committee therefore recommend that the results of the researches obtained at the regional stations as also other necessary technical information may be disseminated for the benefit of the rural milk producers with the assistance of the concerned Government Departments and other concerned organisations dealing with milk production. The Committee would suggest that the question of bringing out publications in the regional

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		languages may be taken up by the Central Government with the State Government.
16	49	The Committee feel that enough attention has not been given by the Government to ensure coordination between the National Dairy Research Institute and other Institutes interested in certain aspects of dairy research. The Committee cannot too strongly urge the importance for effecting purposeful coordination between the National Dairy Research Institute and the Indian Veterinary Research Institute, the two sister organisations dealing with more or less correlated problems. There is also a paramount need for maintaining effective liaison with the dairy institutes in the various States. The Committee would like the Government to devise suitable measures by which greater coordination is brought about between the National Dairy Research Institute and other dairy institutes in the country so that duplication of research effort is avoided as far as possible and a well-coordinated and purposeful programme of research suited to practical requirements is taken up.
17	50	The Committee welcome the constitution of the Dairy Research Advisory Committee and hope that its recommendations will be considered by Government so that the research work of the National Dairy Research Institute is reoriented without delay to suit the specific needs of the industry.
18	51	The Committee would recommend that performance reviews of the National Dairy Research Institute and its regional stations may be made in the third/fourth year of each Five Year Plan period so that the suggestions regarding future lines of development can be duly incorporated in the next Plan period. The Committee also suggest that the Indian Council of Agricultural Research should maintain a list of specialists on an All-India basis whose services can be obtained, when necessary for constituting the Achievement Audit Team.

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19	52	The Committee are unhappy to note that the research work in the Division of Dairy Technology and Engineering are not commensurate with the facilities available. The Committee would stress that a properly coordinated programme for intensifying research in problems of practical importance to dairy industry should be taken up in these Divisions. The achievements of these two Divisions may again be critically reviewed after a year or so by the Dairy Research Advisory Committee to make sure that improvements on the suggested lines have in fact taken place.
20	53	The Committee feel that as the Hansa Milk Test becomes more and more popular, the testing kits including the serum may be commercially exploited with the help of the National Research Development Corporation.
21	54	The Committee would recommend that as soon as the milk chilling unit will be fully developed, it should be patented by the Institute and commercially exploited through the National Research Development Corporation.
22	55	The Committee suggest that the research work on the production of rennet should be intensified so that in course of time the country could be made self-sufficient in the production of rennet.
23	58	(i) The Committee find it difficult to reconcile the views expressed by Second Dairy Industry Conference that large capacities available with manufacturers of dairy equipment lie unutilised with the Government's claim that the reason for slow progress in dairying is the paucity of modern dairy equipment. The Committee would suggest that there should be effective coordination between the Ministry of Industry and Supply and the Ministry of Food & Agriculture. They would suggest that the Dairy Machinery Committee should be asked to go into the matter in detail and suggest ways and means of utilising the existing capacity and to take suitable measures to meet the country's requirements during the Fourth Plan period.

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		(ii) The Committee would incidentally like to point out that the Dairy Machinery Committee does not include any representative of National Dairy Research Institute which is the premier Institute in Dairying and has Divisions of Dairy Technology and Engineering and knows the practical problems at first-hand through extension wing and its regional stations. The Committee suggest that Dairy Machinery Committee should include a representative of the National Dairy Research Institute.
24	59	The Committee consider that advances made by the foreign countries in dairy equipment and implements should be continuously and systematically studied by the National Dairy Research Institute with a view to adapt them and encourage their manufacture in the country.
25	60	As the cattle development is intimately linked up with agricultural development, the Committee consider that promotion of the animal husbandry can make a meaningful contribution to the solution of the basic problems facing the nation and therefore urge the Government to take energetic steps in this direction.
26	61	The Committee would urge the encouragement of cooperatives in dairying and animal husbandry.
27	70	The Committee regret to note that there has been a shortfall to the extent of Rs. 45 lakhs in the construction of buildings which had to be carried forward for completion from the Second to the Third Plan and that out of a total of 25 constructional works approved for the Third Plan period as many as 19 constituted the spill-over of the Second Plan. With regard to appointment of staff, the performance of the Institute is equally unsatisfactory in as much as 17 posts are yet to be created and 19 posts still remain to be filled. The Committee would stress that the execution of Plan projects which are essential for the development of the Institute should be speeded up so that these are completed within the Third Plan period itself.

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		The Committee also suggest that detailed planning of schemes to be undertaken in the Fourth Plan period should be taken up now so that their execution is evenly spread throughout the period of the Plan and necessity of spill-over from one Plan to another Plan is obviated.
28	75	The Committee are unhappy to note that the training facilities available at the Indian Veterinary Research Institute in various courses of veterinary science have not been utilised fully. Whereas the annual capacity of the Institute for M.V.Sc. courses is 60, only 22 students were admitted in 1961-62 and 1962-63 and only 46 students were admitted in 1963-64. The Committee recommend that an Achievement Audit Committee may assess the working of the Post-Graduate College of the Institute with a view to explore the possibilities of utilising in full the training facilities available at the Institute. The Committee would recommend that all possible measures should be taken to attract adequate number of meritorious students interested in the subject to take up the courses.
29	77	The Committee note that a proposal to set up a separate station independent of the Indian Veterinary Research Institute to intensify researches on foot-and-mouth disease during the Fourth Plan is at present under consideration of the Planning Commission. While the Committee appreciate the necessity of intensifying research on the foot-and-mouth disease, they feel that any research on this disease should be carried out under the auspices and technical supervision of the Indian Veterinary Research Institute which is the premier Institution in the country dealing with animal diseases and which has already made some progress in research in this line.
30	78	In view of the serious threat posed by the tuberculosis disease to the developing livestock industry of the country, the Committee urge that a vigorous campaign on the lines of the Rinderpest Eradication Campaign launched by the Institute with

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		noticeable success in 1954 should be launched without delay for eradication of this disease in close co-operation with the State Departments of Animal Husbandry.
31	79	The Committee suggest that the manufacture of oil adjuvant vaccine which has proved efficacious in controlling Haemorrhagic Septicaemia should be increasingly taken up by the States. The Committee also suggest that the Institute should provide technical know-how in the manufacture of the vaccine to the States in the initial stages. To this end the Committee suggest that the programme for training State personnel in the manufacture of this vaccine may be drawn up in consultation with State Governments.
32	80	The Committee are happy to note the achievement of the Indian Veterinary Research Institute in regard to the evolution of the Ranikhet disease vaccine. They urge that effective steps may be taken in consultation with the State Governments to popularise the vaccine among the poultry breeders so that the disease may be eradicated to the benefit of the poultry industry.
33	81	In view of the meagre information available at present on the application of the indigenous plants which are reputed to have therapeutic value in veterinary practice, the Committee would urge that researches in this direction should be intensified in the Institute and in collaboration with State research institutions.
34	82	As the poultry provides a source of rich protein for improving the levels of nutrition and is also helpful in giving gainful employment to people both in rural and urban areas, the Committee would urge that researches should be intensified to evolve cheap nutritional poultry feed so that more people can take up poultry keeping as a subsidiary occupation. The Committee feel that with cheaper feed being available, the poultry industry can make significant progress.

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35	84	The Committee recommend that urgent steps may be taken to provide a modern building suitable for the production of bacterial vaccines.
36	85	As frequent breakdowns in electricity supply and inadequate supply of water are apt to cause financial loss to the Institute on account of low production of biological products and also result in deterioration of the quantity and potency of biological products issued, the Committee recommend that urgent action should be taken to make available constant, steady and reliable electricity supply.
37	86	The Committee take it that as research develops, more and more effective vaccines/antisera would be produced. They recommend that the Institute should periodically review the efficacy of as well as the demand for the biological products manufactured by the Division of Biological Products with a view to gradually stop the manufacture of those products that are out-dated and take up the manufacture of new vaccines and antisera.
38	87	The Committee would like to invite attention to recommendation contained in para 13 of their 79th Report (Third Lok Sabha) on Central Potato Research Institute wherein they had suggested that a high-powered committee may be constituted urgently to go into the question of providing an effective and purposeful link between the research institutes and the farmer. The Committee note that whereas the National Dairy Research Institute conducts short courses in dairy extension, Indian Veterinary Research Institute has no course to train the extension personnel of the State Governments in the application of Veterinary researches being carried out at the Institute. The Committee consider that the Indian Veterinary Research Institute should play a key role in training the State personnel in extension methods so that the researches of the Institute are carried to the farmers and their problems are brought to the notice of the Institute for solution.

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39	88	The Committee feel that there is some force in the argument that the Indian Veterinary Research Institute should be allowed to have regional experimental stations for special study of the problems peculiar to the regions where the sub-stations are to be set-up. The Committee hope that Government would come to an early decision in the matter so that problems of regional nature can be effectively tackled by the Indian Veterinary Research Institute.
40	89	(i) The Committee are unhappy to note that a large number of machinery and equipment remained idle for several years thus hampering the research work of the Institute. Even now some items of equipment are lying unused. The Committee would urge that immediate steps should be taken to put the idle machinery and equipment into service. (ii) The Committee have also noted that non-utilisation of research equipment is a feature which is to be noticed in most of the Central agricultural research institutes. The Committee would urge that before the machinery and equipment are purchased, all preliminaries for the utilisation of machinery and equipment should be finalised so that there is no delay in commissioning them.
41	90	The Committee cannot too strongly stress the need for collection of reliable statistics in regard to the animal husbandry matters as successful planning for research depends on accurate and upto-date statistics. The Committee suggest that Indian Council of Agricultural Research which has under it the Institute of Agricultural Research Statistics should be entrusted with collecting and collating statistics on animal husbandry matters in close collaboration with State Governments.
42	91	The Committee are unhappy to note that the project files of the Institute were not being properly maintained in the past. While appreciating the

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		recent measures taken to improve the maintenance and recording of original research records, the Committee would like to suggest that a uniform procedure for maintaining records of original research in all the research institutes under the Ministry of Food and Agriculture may be evolved after a comparative study of the system followed in the research laboratories under the Council of Scientific and Industrial Research.
43	92	The Committee regret to note that the publication of Annual Reports which contain an authentic record of Institute's activities should have been discontinued on grounds of economy. The Committee recommend that Annual Reports of the Indian Veterinary Research Institute should be regularly published in time and supplied to the State Governments and concerned institutions to keep them informed about the work that is being done by the Institute.
44	95	The Committee hope that educative propaganda in regard to the importance of prevention and of prophylactic measures to be taken against the spread of infection and outbreaks of seasonal diseases will be carried out effectively in conjunction with the State Governments.

APPENDIX VIII

(*Vide* Introduction)

Analysis of conclusions/Recommendations contained in the Report

I. CLASSIFICATION OF RECOMMENDATION;—

A. Recommendations for improving the Organisation and Working :

Serial Nos. 10, 11, 13, 18, 19, 28, 35, 36, 39, 40, 42 and 43.

B. Recommendations for effecting economy :

Serial Nos. 1, 2, 6(ii), 17, 22, 27, 29 and 37.

C. Miscellaneous Recommendations :

Serial Nos. 3, 4, 5, 6(1), 7, 8, 9, 12, 14, 15, 16, 20, 21, 23, 24, 25, 26, 30, 31, 32, 33, 34, 38, 41 and 44.

II. ANALYSIS OF MORE IMPORTANT RECOMMENDATIONS DIRECTED TOWARD ECONOMY.

S. No.	S. No. as per Summary of Recommendations (Appendix VII)	Particulars
1	1	Spill-over of projects from one Plan to another Plan should be avoided.
2	2	A properly phased programme should be prepared in advance for implementation of the projects during the Fourth Plan period so that the entire provision is utilised in time.
3	6(ii)	Overlapping and duplication of work in developing grasses and fodder by various research institutes should be avoided.
4	17	Research programme of National Dairy Research Institute should be reoriented as per recommendation of the Dairy Research Advisory Committee.

1	2	3
5	22	Production of rennet should be intensified so as to make the country self-sufficient in rennet.
6	27	Detailed planning of schemes to be undertaken in respect of Indian Veterinary Research Institute should be drawn up now so that their execution is evently spread throughout the period of the plan is avoided.
7	29	The proposed station for foot-and-mouth disease should function under the auspices of Indian Veterinary Research Institute.
8	37	The Indian Veterinary Research Institute should stop the manufacture of those biological products that are out-dated.

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