Pakistan

Livestock Reproduction and Artificial Insemination

by

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I. INTRODUCTION

1. This report covers the activities of the Adviser in Livestock Reproduction and Artificial Insemination, from 1 November 1980 to 30 October 1981, within the framework of Credit Agreement No. 678, signed on 18 February 1977 between the Government of the Islamic Republic of Pakistan and the International Development Association, as provided by the Food and Agriculture Organization (FAO) under sub-contract to Unesco.

- Project Background

2. The Agriculture College, called "King George V Institute of Agriculture", was established in 1939-40 at Sakrand and was later (1954-55) shifted to Tandojam and renamed Sind Agriculture College, Tandojam. The College was up-graded to the status of additional campus of Sind University, Jamshoro, in July 1976 and became a fully-fledged University in March 1977.

3. The Faculty of Animal Husbandry and Veterinary Science is an integral part of the University of Tandojam. The faculty is the only academic veterinary institution supporting extension services in Sind and Baluchistan Provinces for veterinary and/or animal husbandry officers. The veterinary training was introduced in 1971 as part of the animal husbandry training. To date, the faculty has produced a total of 300 graduates. The facilities on the whole have remained more or less unchanged since the college era. The buildings, classrooms, laboratories, offices and equipment are inadequate for training 50 students per year.

4. A veterinarian should be a person with wide, comprehensive knowledge and experience of animals in health and disease, trained to apply that knowledge in recognition, prophylaxis and treatment of animal diseases. He should know about improvement of animal production, the enhancement of animal welfare and the safeguarding of the health of human beings. These are the aims and objectives of veterinary training. It is true that the role of the veterinarian can vary from one country to another, depending on the economic needs, the social development, the nature of the animal population and the different kinds of animal diseases.

5. There is a growing trend in Pakistan towards keeping more productive livestock under better feeding and management conditions. The introduction of sophisticated techniques in herd improvements is anticipated in the near future. The inputs provided under the Third Education Project are ones that attempt to improve conditions and the standard of agricultural education; the graduates of this faculty are not yet competitive with graduates of other veterinary faculties in Pakistan, nor with those of other countries.

6. A report on a Technical Assistance Mission in 1976 indicated that cattle and buffalo livestock do not start reproducing until four to five years of age and that calving is at approximately two-year intervals. The report emphasized the urgent need to teach animal reproduction. However, it emphasized that training should not begin until the necessary equipment had been provided.
7. The following activities were identified as the expert's terms of reference:

(a) To assist the faculty of animal husbandry and/or veterinary science in developing a programme for teaching and research in artificial insemination.

(b) To assist the faculty to develop a curriculum and appropriate teaching techniques for a course in reproduction physiology.

(c) To train members of the faculty in the early detection of pregnancy.

(d) To assist in setting up appropriate short courses in estrous detection and artificial insemination.

(e) To carry out such other duties within his competence as may be assigned to him.

II. FINDINGS AND CONCLUSIONS

- Organization

8. The minimum qualification required for admission to the University is completion of the Matriculation Examination in Science (ten years of schooling). After completing two years of intermediate science in agriculture, fifty students are admitted to the Faculty. The course work for the D.V.M. Degree as indicated in the University prospectus (1979-80) is distributed over eight semesters with a total of 179 credit hours. The academic year is divided into two semesters:

(a) Autumn Semester - 1 October - 15 February

(b) Spring Semester - 1 March - 15 July

There is a two-month summer holiday from 1 August to 30 September. Each semester lasts 18 weeks; 16 weeks of studies and two weeks for examinations. However, in practice the duration usually does not exceed 15 weeks. The courses are provided by eleven departments, namely:

- Animal Breeding and Genetics
- Animal Nutrition
- Poultry Husbandry
- Dairy Technology
- Livestock Management
- Anatomy
- Physiology
- Parasitology
- Microbiology and Pathology
- Pharmacology and Medicines
- Surgery and Obstetrics.

9. The Faculty is also supposed to offer courses leading to higher degrees: M.Sc., M. Phil., and Ph. D.
10. Hardly any graduates in the last three years have been accepted for employment as veterinarians, although the expanding livestock, dairy and poultry industries are undoubtedly in desperate need of efficient veterinary services. Moreover, inadequate practical training provided does not equip the graduates to go into private practice. Instead many are accepting stock assistance posts. In the latest annual report of the Sind Public Service Commission, serious concern at the falling educational standards of the Faculty was expressed. It urged the concerned parties to take effective measures to improve the situation.

11. Efforts to consolidate courses in animal reproduction were successful and a department of Animal Reproduction has been established with the framework of the Division of Clinical Studies. In the most recent reorganization of the Faculty, the following divisions, which include the different departments, were established.

(i) Animal Husbandry Division
   (a) Department of Livestock Management and Poultry Husbandry.
   (b) Department of Animal Breeding Genetics, Animal Nutrition and Dairy Technology.

(ii) Pre-Clinical Division
   (a) Department of Anatomy Histology, Physiology, Biochemistry and Pharmacology.
   (b) Department of Parasitology, Pathology and Microbiology.

(iii) Clinical Division
   Department of Medicine, Surgery and Animal Reproduction.

12. The requirements of the newly-established department were worked out to meet the needs of fifty students per year in Obstetrics, Gynaecology, Andrology and Artificial Insemination. The syllabus for the department was outlined on the assumption that the department would offer two main courses at undergraduate level, (a) Animal Obstetrics and Gynaecology, (b) Andrology and Artificial Insemination.

13. The basis for cooperation between the department and extension services was laid down. Outlines for in-service training of technical staff and for training Veterinarians in sexual health control and artificial insemination were prescribed.

- Teaching Staff

14. The Faculty lacks qualified staff. The total number of teachers is 23, of whom only three have the necessary qualifications to teach at University level. This has contributed to the low standard of achievement. The lack of scientific leadership, the stress of the economic structure and bureaucratic organization of the Faculty have lowered the morale of the staff tremendously, and this is reflected in their dedication and performance.
15. The newly established division will be strengthened by two lecturers who are completing their Ph.D. degrees in United States of America and Australia. Provisions are being made to send two others abroad for further studies.

- Students

16. The students are admitted to the University after completing Class X. They attend basic science classes before starting their professional courses. It is obvious that the scientific background of the students is very poor. It is presumed that they are taught in English. However, only a small percentage (10 - 15%) of the students can understand and express themselves in English. It would be more appropriate to admit students after completing class XII. The absence of properly qualified, trained teachers, the absence of textbooks or handouts, and the absence of the proper facilities for practical training have led to a situation where the training has lost credibility and the students have little hope of success. There are no incentives to promote hard work, or serious study. The examinations, which should be a major incentive for the students, do not offer relevant goals for the work of each semester. For a student to pass, he only needs 40 - 49 marks out of a hundred. He can get 10 marks for attendance, 15 marks for assignments, 25 marks from his mid-term examination. Moreover, the large number of options for the final examination makes the student's task too easy. Therefore, he can pass a course without exerting himself at the final examination.

- Facilities

(a) Buildings

17. The physical facilities of the Faculty will improve to some extent after the completion of two new buildings by the end of 1981. The detailed requirements and utilization of the available buildings were worked out and presented to the University Administration by the advisers in Animal Husbandry and Veterinary Science. The requirements of the Department of Animal Reproduction were described in detail. Plans for the establishment of the clinical centre were prepared in collaboration with the other two Departments, i.e., surgery and medicine.

(b) Equipment

18. A list of equipment had been ordered prior to the arrival of international advisers. Nothing had been ordered for the Animal Reproduction Department. A supplementary list of needed equipment was drawn up.

III. RECOMMENDATIONS

19. The present Faculty needs to be reinforced. Scientific leadership, qualified, trained instructors, and improved facilities are badly needed. A large capital investment is required as well as willing, motivated students. Only with a major effort can a proper, scientific environment be created. It will take several years to reach these goals. Alternatively, the Faculty could seek additional training with another, well developed Faculty. A large-scale exchange of teaching staff could be arranged. This approach has been tried successfully in similar situations in Pakistan.
20. The graduates of the Faculty cannot yet be considered as fully-fledged Veterinarians. Nor are they qualified as Animal Husbandry Officers. It is proposed that the Faculty provide training in both disciplines, awarding two degrees (D.V.M. and B.Sc. A.H.). To overcome these problems, the Animal Husbandry Division should be shifted to the Faculty of Agriculture, as is the case in most countries, or an independent Faculty of Animal Husbandry could be established.

21. Provisions should be made for the training of the technical staff, either in institutions abroad or in Pakistan.

22. The administrative structures and procedures of the University should be reorganized with the intention of giving the departments and the Faculty a great deal more autonomy.

23. Whatever system is used for organizing the teaching activities (semesters, quarters, full years, etc.) the time-tables and calendars must be followed.

24. The curriculum should be completely revised in veterinary medicine and animal husbandry. The revised curricula should include only what can actually be taught.

25. The University should print scientific materials and instructional materials prepared by the concerned departments, and should make these available (through subsidies) at the lowest cost to all students.

26. The introduction of external examiners seems essential at this stage. The system of examination should be revised to place greater emphasis on the final examination. Attendance, assignments and the mid-term examinations should be used only as criteria for the right to sit for the final. A system under which students can evaluate the performance of their teachers should be introduced. Students should be represented on committees dealing with academic planning, problems, etc.

27. Graduate Studies: The present status of the Faculty staff, library facilities, buildings, etc. does not permit the teaching of graduate courses or the awarding of higher degrees. Only qualified, experienced staff should be allowed to supervise research in their specific areas.
Department of Animal Reproduction Requirements

The Faculty of Animal Husbandry and Veterinary Science is an integral part of Sind Agriculture University at Tandojam and is responsible for the provision of extension services in Sind and Baluchistan Provinces. The University is in the early stages of development. It only became a fully fledged university in 1977. Veterinary training was introduced in 1971 as part of the Animal Husbandry training in the university. So far, the faculty has produced 200 graduates, although the facilities as a whole are more or less unchanged since the college era. The physical facilities in terms of buildings, classrooms, laboratories, offices and equipment are far below the standard required for teaching and training 50 students per year. The training of a veterinarian is costly. However, the impact of a well trained veterinarian on animal production will justify the cost, if comprehensive knowledge and wide experience of animals in health and disease is achieved. With the ever-increasing human population, the need for intensive annual production is evident.

The elimination or control of factors inhibiting production and reproduction have received great attention during the last few decades. Recently, the Sind Agricultural University has realized the importance of increased knowledge, and pathological studies in animal reproduction by establishing a department to provide different aspects of teaching, training and research in the area of veterinary education. The newly-established department is a part of the clinical division which combines the departments of Surgery and Medicine. It is anticipated that the three departments will organise the ambulatory service.

The department will be responsible for teaching various specialized subjects: Obstetrics, gynaecology, andrology and artificial insemination. The department will teach 50 students per year, in addition to initiating post-graduate courses leading to higher degrees. The department will also conduct some short courses; in-service training for veterinarians and technicians of the extension service. With the introduction of Artificial Insemination the role of the department will be extremely important, provided an effective co-operation is arranged with the extension services.

Requirements

The requirements of any academic institution are governed by the number of students attending the courses, the nature of the subject and the degree of its involvement in national problems or projects. The present arrangements for teaching this subject are highly unsatisfactory and do not provide the necessary facilities required for teaching the subject. Bearing in mind the great importance of practical training, and the diversification of the subject, the following needs are urgent.
ANNEX 1 (Cont'd.)

A. Staff

The staff needed for teaching animal reproduction to a maximum of 50 undergraduate students will be:

- One professor
- Three associate professors
- Six assistant professors and lecturers
- Two technicians.

This will allow a reasonable lecturer: student ratio of 1:5. Provisions should also be made for the training of the staff.

B. Buildings

(i) Requirements for clinical work

- A phantom hall which is spacious to hold five phantom boxes, two palpation tables, space for storing equipment, two walk-in cold rooms and a freeze store.
- Stationary clinic or part of the clinics/hospital for obstetrical, gynaecological and andrological cases.
- Holding facilities for at least ten bulls attached to laboratories for semen evaluation and adjacent to an area for semen collection.
- Holding spaces for at least twenty animals where cases of interest for teaching and research can be kept.
- Exercise facility for bulls.

(ii) Requirements for teaching and academic work

- Lecture rooms
- Research laboratories
- Teaching laboratory where at least 25 students can work at a time
- Museum
- Departmental library
- Balance room
- Dark room
- Chemistry laboratory
- Histology laboratory
- Offices.
(iii) Provisions should also be made for securing the teaching and research material:
- Sexual organs from the slaughterhouse
- Prenslaughter examination of animals by students and staff
- Animals attending the clinics
- University farm
- Ambulatory clinic.

C. Equipment and Chemicals
- General laboratory equipment, glassware, etc.
- Specialized equipment for semen collection, examination and preservation.
- Equipment for histological, biochemical, pathological and physiological studies.
- General surgical and obstetrical instruments.
- Visual aids.

D. Duration of courses in Animal Reproduction
- Course I, Animal Obstetrics and Gynaecology should be allocated 30 hours of theory and 60 hours of practicals.
- Course II, Andrology and Artificial Insemination should be allocated 30 hours of theory and 60 hours of practicals.
ANNEX 2

Department of Animal Reproduction
Undergraduate Courses

I. ANIMAL OBSTETRICS AND GYNAECOLOGY

Theory

Basic principles of physiology of reproduction in female animals, with special emphasis on hormonal control and the use of these phenomena in clinical diagnosis, treatment and control. Puberty, oestrous cycle, ovulation, fertilization, implantation, foetal development, placentation and the role of pituitary trophic hormones, sex hormones and neurohormones. Pregnancy, incidence of anomalies during pregnancy, diagnosis of pregnancy, parturition, presentation and position of foetus, handling of parturient animals, postpartal care of both mother and calf. Hygiene during handling parturient animals. Dystokia: definition, causes, approach to obstetrical cases in different species, correction, foetotomy and caesarian section.

Introduction to the importance of reproductive performance on livestock/dairy industry, fertility in farm animals, different methods of assessing reproductive performance. Infertility in farm animals, causes, identification, course of different diseases, control, effect of management and nutrition on reproduction.

Practicals

- Obstetrical Training

(a) Preparation of animal for obstetrical interference.
(b) The use of anaesthesia during obstetrical operations with special emphasis on epidural anesthesia.
(c) Correction of different positions and presentation.
(d) Foetotomy and use of different instruments.
(e) Caesarian section.
(f) Examination of reproductive organs collected from the slaughterhouses.
(g) Clinical examination of reproductive organs, pregnancy diagnosis: rectal techniques, infertility diagnosis, field infertility investigations.
(h) Collection of samples for further laboratory investigations: blood, vaginal mucus, foetus, foetal excretions and foetal membranes.
ANNEX 2 (Cont'd.)

II. ANDROLOGY AND ARTIFICIAL INSEMINATION

Theory

The fundamental introduction to anatomy and physiology of reproduction in male animal. Puberty, maturity, spermatogenesis, sperm maturation and the hormonal control of these processes. Functions of different parts of reproductive system and its contributions to the ejaculates. Ejaculation and effect of management on sexual behaviour, on libido, sexual desire, reaction time.

Frequency of ejaculation in different species, effect of environmental factors on sire utilization.

Factors affecting fertility in bulls, bull investigation, different diseases affecting herd fertility and the role of bull in the spread of diseases, diagnosis, treatment and control.

Semen: collection of semen, sperm morphology, evaluation, handling and storage, introduction to the biochemistry of semen. Different diluents and dilution rates.

Artificial insemination: Introduction, history, development, scope, advantages and disadvantages, methods of inseminations, record keeping.

Practicals

- Examination of reproductive organs of male animals in the laboratory.
- Bull investigation and evaluation. Preparation of bulls for semen collection.
- Preparation of artificial vagina for semen collection, sterilization and maintenance of equipment, hygiene and precautions during semen collection.
- Semen evaluation. Preparation of diluents and semen dilution, preservation under room and low temperatures.
- Artificial insemination training in laboratory on reproductive organs and on animals for A.I. Record keeping.
- Collection of samples from bulls for further laboratory examinations.