

IDA/700-PAK-10  
Assignment Report  
Agricultural Education

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P A K I S T A N

Animal Husbandry and Veterinary Science  
by  
Sumer Hasimoglu

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## I. INTRODUCTION

### Assignment Background and Objectives

1. The assignment covered by this report formed part of Pakistan's Third Education Project, supported by the World Bank. The project's main objectives were to improve the quality of agricultural education in the provinces of Sind and Baluchistan and to implement the curriculum reforms contained in the new education policy announced by the Government of Pakistan during 1972.

2. Unesco was appointed as the UN Executing Agency for relevant parts of the project, and FAO was assigned the responsibility of providing five Advisers for twelve-month assignments, and Consultants for six-month assignments, to assist the Sind Agriculture University at Tandojam. One of the fields in which assistance was to be given was Animal Nutrition, within the University's Animal Husbandry and Veterinary Science Faculty.

### Sind Agriculture University

3. In 1940, the King George Vth Institute of Agriculture was established at Sakrand. In 1955, it was moved to Tandojam and renamed Sind Agriculture College. In 1977, this was upgraded to be an independent University: Sind Agriculture University. The total area covered by the campus is 181 hectares, including an area of 81 hectares occupied by University buildings.

### Faculty of Animal Husbandry and Veterinary Science

4. The University's Faculty of Animal Husbandry and Veterinary Science is the only institution responsible for meeting the requirements of the Provinces of Sind and Baluchistan for trained veterinarians. The Faculty started such training in 1971: before then, being a Faculty with College status, it awarded a degree in Animal Husbandry. Since 1975, the Faculty has produced a total of 300 doctors of veterinary medicine.

5. Since 1981, the Faculty has had three main divisions, containing thirteen departments, namely:

- a) Animal Husbandry Division - Departments of: Livestock Management, Poultry Husbandry, Animal Breeding and Genetics, Dairy Technology and Animal Nutrition.
- b) Pre-Clinical Division - Departments of: Anatomy and Histology, Physiology and Bio-chemistry, Pharmacology, Parasitology, Micro-biology and Pathology.
- c) Clinical Division - Departments of: Medicine, Surgery and Animal Reproduction.

6. The Faculty teaching staff at present available numbers 21, but the actual number is 31: one of the staff members is assigned to the Open University and 9 others are abroad. The Faculty has three old buildings and has two new ones under construction. It also has a livestock farm, with 50 acres of land for fodder production, together with barns and dairy sheds, for training, practical work and experiments.

#### Animal Nutrition Department

7. The Animal Nutrition Department is at present functioning in an old building with two offices and a feed analysis laboratory (7x5m). It has two assistant professors (one a Ph.D. from the Soviet Union and the other an M.S. Honours), a lecturer and four postgraduate students. The Department offers two courses at undergraduate and four at post-graduate level.

#### Adviser's duties

8. The Adviser arrived at his duty station, Sind Agriculture University at Tandojam, on 18 May 1981, his responsibilities being to:

- a) assist the Faculty to assess animal nutrition problems and advise on their solution;
- b) assist in developing a course or courses in animal nutrition, with relevant methods and materials;
- c) assist in assessing the nutritional value of different feeds available in Sind, especially those available from commercial sources;
- d) advise on the growth, storage and use of feeds suitable for use in Sind Province;
- e) prepare, in his field of competence, technical documents, such as manuals, guidelines and brochures, related to animal husbandry and veterinary sciences, to be put at the disposal of the Faculty of Agriculture; and to
- f) carry out such other duties within his competence as might be assigned to him.

## II. ACTIVITIES AND RESULTS

### Animal Nutrition (Feed Analysis) Laboratory

9. Main assignment activities and results in respect of the animal nutrition (feed analysis) laboratory were:

- a) with the cooperation of staff members the laboratory was reorganized, repairs were done, the electrical system was augmented and the water system renewed. With the new glassware obtained through the FAO/PAK/74/067 project, and with the present facilities, it is possible to analyse samples for dry matter, total ash, crude fibres and crude protein.

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- b) Two staff members were sent to be trained at Karachi Poultry Research Institute, being paid per diem from funds provided by FAO/PAK/74/067 and by the University.
- c) Staff members and graduate students were instructed in proximate analysis and in preparing different reagents and solutions. A list was prepared, and submitted to the University administration, of the laboratory equipment, glassware and chemicals required.

#### Library

10. To establish a departmental library more than 75 letters were sent to various international institutions, including FAO, and these latter provided over 550 books and other publications, such as bulletins. More are expected in the future. With the cooperation of staff members, the Adviser compiled two book lists, which were submitted to the University administration for requisition.

#### Teaching and curricula

11. The Adviser's activities in teaching and curricular matters included:
- a) preparation of a lecture outline, subsequently augmented and distributed to staff and students, for the Feeds and Feeding I course;
  - b) participation in teaching and practical work at both postgraduate and undergraduate levels;
  - c) conducting discussion-type classes, in which instructors were invited to join;
  - d) suggestions on how to improve teaching;
  - e) allocation of students' assignments;
  - f) instruction of students, by means of practical work, in hay-making, silage and feed mixing.

Unforeseen interruptions in the holding of classes reduced the continuity and effectiveness of teaching at both postgraduate and undergraduate levels.

12. With the cooperation of staff members the Adviser prepared a report giving suggestions for the curricula and syllabuses of the Animal Nutrition Department. This was submitted to the Dean's office. The Adviser was also instrumental in arranging a departmental seminar programme. Two seminars have taken place and a third is scheduled.

#### Field visits

13. Field visits were made to rain-fed areas to determine their animal production capacity, and students were taken also to a sugar factory.

### Research

14. Three research experiments on animal nutrition were conducted during the assignment and preparations were made for a fourth - a digestion trial on silages from banana leaves and stems, berseem and aquatic plants. The first experiment was conducted at Khipre, in connection with a postgraduate student's M.Sc. thesis, on the possibilities of using silage from aquatic plants grown in the Naro Canal, as roughage in feed for growing lambs. The results were analysed statistically using a computer from another project.

15. With the cooperation of staff members and postgraduate students, the other two experiments were conducted in connection with the establishment of a small feed plot. One was on the possibility of using sugar-cane bagasse in fattening feeds for heifers, and was supplemented by a digestion trial carried out in connection with a staff member's M.Sc. thesis. The other experiment was on the fattening of young steers and buffaloes on straw-based feeds and on increasing the digestibility of these. In both experiments the animals' body measurements were taken to determine their growth rates.

16. The findings of these three experiments may be summarised as follows:

- a) Ensiled aquatic plants (*latifolia angistifolia*) could be utilised in livestock feeding, at least as part of the roughage portion of the rations.
- b) bagasse has a potential as a 30-35% component in cattle fattening rations, and sodium hydroxide (NaOH) treatment increases its digestibility.
- c) Untreated straw-based rations gave better results with male buffaloes than with steers. Sodium hydroxide treatment of only the straw portion of the ration resulted in better performance by steers as far as the whole experimental period is concerned. However, treatment of the whole straw-based ration with NaOH resulted in a better performance by steers, especially during the last 14 days, than that of steers fed only rations in which the straw portion alone had been so treated.

17. Samples of some 80 local feedstuffs were sent for analysis to the Karachi Poultry Research Institute. The data obtained were used in a working paper (noted below) prepared with the cooperation of Institute and Department staff.

18. To prepare for the establishment of a Research Coordinating Unit in Tandojam, under Project FAO/PAK/80/019, the Adviser visited Islamabad. After consultations, he prepared and submitted a report, entitled "Establishment of a Research Coordinating Unit in Tandojam; Facilities and Constraints". A water pump provided by the project for this Unit was brought to Tandojam and installed for present and future use on the Faculty's livestock farm. Plans for establishing the Unit were finalised and it was expected to start full activities without much delay.

### Working Papers and Reports

19. With the cooperation of other experts, of staff members and of the Karachi Poultry Research Institute staff, the Adviser prepared a report and three working papers:

- a) Report - Recommendations for the future expansion and organisation of the Faculty of Animal Husbandry and Veterinary Science.
- b) Working Papers -
  - i) A preliminary study of animal production potentials and research priorities in Sind.
  - ii) The current situation and future outlook for feedstuffs production in Sind.
  - iii) Composition of various Sind Province feeding stuffs and their use.

### III. CONCLUSIONS AND RECOMMENDATIONS

20. The conclusions reached and the Adviser's recommendations may be grouped under two headings, Sind Agriculture University and Livestock in Sind Province.

#### A. SIND AGRICULTURE UNIVERSITY

##### Setting

21. In Sind, agriculture provides around 30% of its gross domestic product, and so is important not only for the rural farmers but for the whole Province. As Sind's only higher education institution concerned with agriculture, the Sind Agriculture University needs to focus its training and research activities on the villages, so that, through increased knowledge and skills, the farmers and villagers may improve their output. For this there is a need to mobilize provincial, national and external resources, not only for short- and medium-term training but also for long-term agricultural education.

##### Structure

22. The University has reached the stage at which the academic work of the University should be consolidated with the introduction of more effective teaching methods, and revised, up-dated curricula in all departments. Extension services should also be provided by each faculty, providing on-the-spot advice and assistance to farmers and villagers and data for research activities, so enabling the University to participate more fully in rural development programmes.



23. The livestock sector is of primary importance in Sind, in providing both animal products and draft animals, and there is a need to expand training in livestock management, feeding and associated subjects.

24. To improve both animal husbandry and veterinary training, the Adviser recommended that a new Faculty of Animal Husbandry be established. Alternatively, the present Department could be transferred to the Faculty of Agriculture. He considered that, for Animal Husbandry to attain its proper status, national pay scales in this field would need to be equated with those of veterinarians.

25. For the livestock farm to be used effectively for practical training, extension work and research, it should be made an autonomous unit under the Dean of the Faculty of Animal Husbandry and Veterinary Science (or under an analogous official should the Department for the former field be transformed or transferred). A committee for farm policy, planning and programming, with representatives from all faculties, and with the Vice-Chancellor as chairman, should be established, and a full-time farm manager should be appointed.

#### Management

26. Administration, which is slow at present, could be speeded up by greater delegation of responsibility, a reduction of paper work and by encouraging staff members to be more efficient. Such delegation would require higher qualifications for staff, increased and more efficient in-service training, better links among staff members and their acceptance of more responsibility. Improved performance should be reflected in their pay and promotion prospects. The establishment of deputy posts should be considered, to allow top administrators to devote more time to planning. The University authorities are aware of these needs. The alternative structures and procedures should be evaluated by a committee.

27. Two faculty standing committees should be established, one for curricula and the other to advise the Dean. (Should animal husbandry and veterinary science be separated, as suggested above, each should have two committees). The curricula committee might be composed of the Dean of the Faculty, five or six other staff members and a student representative. The committee would deal with all curricular matters, including the establishment of new courses and changes in existing ones.

28. The advisory committee, composed of five or six faculty staff members, would advise the Dean on teaching and other matters and serve as a link between the faculty and the central administration.

#### Staffing

29. Defects in the present staffing include an uneven distribution of teachers, academic isolation of the staff, lack of training in teaching and research, and insufficient training and experience in nutrition. All of these are reflected in staff performance. In the short and medium term, many of these

deficiencies could be remedied and teaching methods improved by in-service training and by secondment of trained and experienced staff, for limited periods, from more advanced national institutions. Secondments could have two-way benefits. Advisers or tutors should be appointed to help the students with their academic problems.

30. Provision should be made for some staff members to obtain an M.Sc. or Ph.D. degree abroad, those sent being carefully selected and the countries and institutions to which they go being carefully matched to their needs. Progress in their studies could then be monitored through correspondence. Such provisions should be continued until the staff is competent to initiate and supervise research and to improve the agricultural education it offers at both undergraduate and postgraduate levels. One or two staff members in the Nutrition Department should be sent abroad for at least six months in connection with the establishment of the Research Coordinating Unit.

31. To raise teaching standards, workshops or courses should be arranged for young instructors. Alternatively, newly-appointed instructors should not be allowed to start teaching unless they have done a teacher-training course, or they should be trained by experienced staff members.

32. To raise the standards of practical work carried out in the laboratories an important factor will be the proper training of the laboratory technical staff who make the preparations for this work. Technicians in the Animal Nutrition Laboratory should receive at least one year's training in a recognised institution. In addition, they should undergo periodical in-service training, possibly abroad, especially in enterprises which have supplied equipment.

### Facilities

33. Laboratories: At present, the Animal Nutrition Laboratory needs only some basic instruments, glassware and chemicals for approximate analysis. Advanced apparatus will not be needed until dust-free rooms and adequate electric and water supplies have been installed and, most important, until the necessary skilled manpower is available. In view of the shortage of resources, replacement needs should be kept to a minimum by competent maintenance and repair of equipment.

34. Libraries: The University's central, faculty and departmental libraries are a very important element in its facilities, and a balanced development of all of them merits high priority. The central and faculty libraries could be made more effective, for both staff and students, by better organization, increased numbers of recommended textbooks, extension of opening hours from 7.30 a.m. to 10 p.m. and air-conditioning and amenities which encourage greater use for reading and preparing lectures and assignments. Technical assistance in the re-organization and improvement of the central library could at this stage advantageously be sought from the Faisalabad University Library rather than from abroad.

35. The new library for the Animal Nutrition Department could be improved by the addition of material obtained from national and international institutions, and by the acquisition of books using university resources.

36. Learning materials: In view of the high price of books and the limited student resources, the University should devise a system by which scientific information could be disseminated among students in an accurate and presentable form at the lowest cost.

37. In this connection, the Animal Nutrition and Veterinary Sciences Departments should prepare materials for all the courses offered. Staff members could be encouraged to take on this task by the payment of honoraria to those who do the work. A lecture outline, prepared for the Feeds and Feeding I Course, could be revised and used as a guide in preparing materials for distribution in other animal nutrition courses.

#### Curricula and methods

The Adviser's conclusions and recommendations on curricula and methods may be summarised as follows:

38. Courses: Consideration should be given to making the first two or two and a half years of the four-year university course into a general course leading to a certificate (not diploma) in Agriculture. This would be particularly suitable for students who own land or do not wish to enroll for the whole four years.

39. Calendar: Semesters should be adjusted to take account of the fact that May and June are the hottest months of the year, and so improve working conditions for both staff and students.

40. Curricular content: Training in veterinary science and in animal husbandry is complex and deals with different species and many subjects. The present curricula do not seem to produce either veterinarians or animal husbandry officers of the desired standard. Curricula should be revised (new curricula will be needed should the two branches be separated as suggested) and oriented less towards traditional classwork and more towards practical application of theory. In particular, the agricultural education offered should be improved by integrating classroom work more fully with practical production activities. The poor command of English on the part of students calls for revisions and reinforcement of the education offered in basic sciences.

41. Methods: Teaching and learning methods employed should cause the students to think rather than merely memorise subject matter. There is no place for teaching by dictation. The discussion-type, with perhaps two or three staff members participating and with the use of audio-visual aids when appropriate, is more likely to hold the students'

attention, and create good relations between staff and students. Post-graduate students should participate in such discussions, rather than being taught in the teachers' rooms, and should likewise assist in laboratory and other practical work.

42. Studies should be problem-oriented with emphasis, particularly in the early stages, on conditions, problems and possible solutions in Sind Province. Advantage should be taken of field visits to observe the application of theory to practice. Staff should ensure regularity and punctuality and take a personal interest in students both in class and outside.

43. Neither staff nor post-graduate students were greatly interested in preparing for, and participating in seminars, especially those in the Faculty, perhaps because these seldom took place. To facilitate exchange of information on new developments in animal husbandry and nutrition, departmental and inter-departmental seminars should be arranged. Post-graduate students should present their research proposals and results so as to have the benefit of comments and assistance from specialists and from other departments. The position of chairman should be shared by departments, on a rotational basis, for a year at a time.

44. Evaluation: There is an urgent need for a new system of student evaluation and grading, with the objective of raising educational standards and creating incentives for learning. Attendance, assignments and other requirements should be included in the criteria for permitting students to sit for examinations prescribed. Tests should be set as often as possible, and assignments and term papers should be marked and returned to the students.

#### Extension

45. The Adviser considered the University should be a teaching and training centre for farmers as well as for students. Extension services should be provided, enabling the University to make a greater contribution to rural development. At the same time these services, with branches in all faculties concerned, could provide valuable data for the University's research activities.

#### Research

46. The University's financial support and physical facilities for research are severely limited, and it is only through special efforts on the part of the staff that the Animal Nutrition Department has reached the stage where it can analyse samples of dry matter, crude fibre, total ash and crude protein. Nevertheless, the Department has carried out some useful research in the field of animal nutrition, further details of which are given in the next section.

47. The Adviser considered that conditions and facilities for the Research Coordinating Unit to be established at Tandojam under FAO's project PAK/80/019 are not ideal. Nevertheless, the establishment of

this Unit would be appropriate and desirable. The Unit would ensure that teachers and other staff are well trained and would improve students' practical work. Further, it would benefit farmers by making livestock production research in Sind an integral part of the province's rural development programme.

## B. LIVESTOCK

### Importance

48. Livestock in Pakistan are an important national resource, producing eggs, meat, milk, meal, hides, draft and portage animals and manure (used as both fertiliser and fuel). In Sind Province, livestock account for about one-third of the value of all agricultural production, and their importance is even greater than this figure may suggest. Since livestock are owned mostly by small farmers, and village households with little or even no land, owning a cow or two, or buffaloes, sheep or goats, livestock improvement offers a great opportunity for large numbers of families to increase their incomes.

### Production and productivity

49. The Adviser considered that there was need for the Government to formulate a policy for agricultural production which would include improvement of livestock production and productivity in Sind. These are undoubtedly - despite lack of firm data - below the Province's potential. Raising them will require expansion of extension services and improvements in the genetic capacity and the feeding of livestock.

### Extension services

50. Animal husbandry and veterinary health services are thinly spread over the livestock areas. Action to increase them should include:

- a) training and employing more livestock officers, veterinarians and agronomists;
- b) improving agricultural education, with emphasis on practical training, so that those trained may be better versed in both crop and livestock production, and have greater confidence when dealing with farmers;
- c) overcoming the Government's present inability to provide adequate differentials in the remuneration of skilled staff working in rural areas remote from the larger centres of population.

### Genetic capacity

51. The present native breeds in Sind have evolved over centuries, in a hard and inhospitable environment which has been a threat to survival. The results have been slow growth, relatively low fertility and low production. To remedy this situation the Adviser considered that breeding studies should be started in Sind, the first step being the establishment in the province of a livestock breeding farm, on the lines of the one at Bahadurnagar in the Punjab. The main emphasis in breeding should be on improving local flocks and herds.

### Feeding

52. In the Adviser's view, improved agricultural education and development of extension services would promote better livestock feeding. New practices taught and demonstrated to farmers by the extension services would replace traditional ways of feeding livestock. The Adviser recommended that existing feed resources should be evaluated and efficiently used, and that increased grazing and forage production for livestock development should have equal priority with cash crop production.

53. Research on livestock feeding carried out by the Animal Nutrition Department showed that the food intake of Sind's livestock is barely above subsistence level, leading to low production. Research showed also that there is a great potential for augmenting present supplies by non-conventional feedstuffs. Large quantities of residues and of plant refuse could supplement hay and silage, especially during the two seasonal food-shortage periods during the year.

### Management

54. Improved management will, the Adviser considered, be needed for planning and implementing livestock development projects in Sind. These should be designed on a multi-disciplinary basis. They should aim at simultaneous and coordinated improvement of genetic quality and of feeding along with that of management, and should incorporate a credit system for their financing. The projects should be supported by a wide range of technical assistance.

### Research

55. Research, the Adviser concluded, is urgently needed to clarify the bases for improving the livestock industry in Sind. The present lack of research can be attributed to shortage of funds, inadequate appreciation of the extent and gravity of the Province's nutritional problems, lack of comprehension of the potential contribution to productivity to be made by better health and nutrition, and absence of planning and resource allocation. Application of science and technology to solve the problems involved in animal and feed production is essential to realise the full production potential of the Sind Province.

56. In the Adviser's view, the Government should formulate a plan for applied research, including priorities, an agricultural census, socio-economic studies, mobilisation of available financial resources, and enlisting of support from all sectors concerned. With this backing, the Sind Agricultural University should use all its related resources - not only those of its Animal Nutrition Department, to examine and evaluate the feedstuffs production capacity of the Province and its future potential. At the same time Sind Agriculture University (SAU) should determine the needs for future research and ways in which they could best be met.

57. When fully established, the Research Coordinating Unit (FAO Project PAK/80/019) will contribute to improving livestock production in Sind by promoting development of new resources, knowledge of modern livestock nutrition and application of science and technology. Three experiments have already been carried out at the facilities available on the University's livestock farm. While the Unit is being established the applied research conducted there should be brought to the attention of project officials so that the results may be used and constraints on livestock improvement be removed as soon as possible.

58. A further experiment has been started on the effects of heat-stress on the performance of bullocks and heifers fed with bagasse-molasses-meal-based rations. Until the Unit is fully established research should continue with the existing facilities. Hay-making and silage activities on the University's farm should also be continued, as these encourage more flexible planning of research projects.

59. It may be noted that many aspects of livestock in Sind have not been fully determined, including livestock production potential and movements, the contribution of the rain-fed areas to production, health matters affecting the livestock population and output, and the chemical, physical and biological values of feeds.