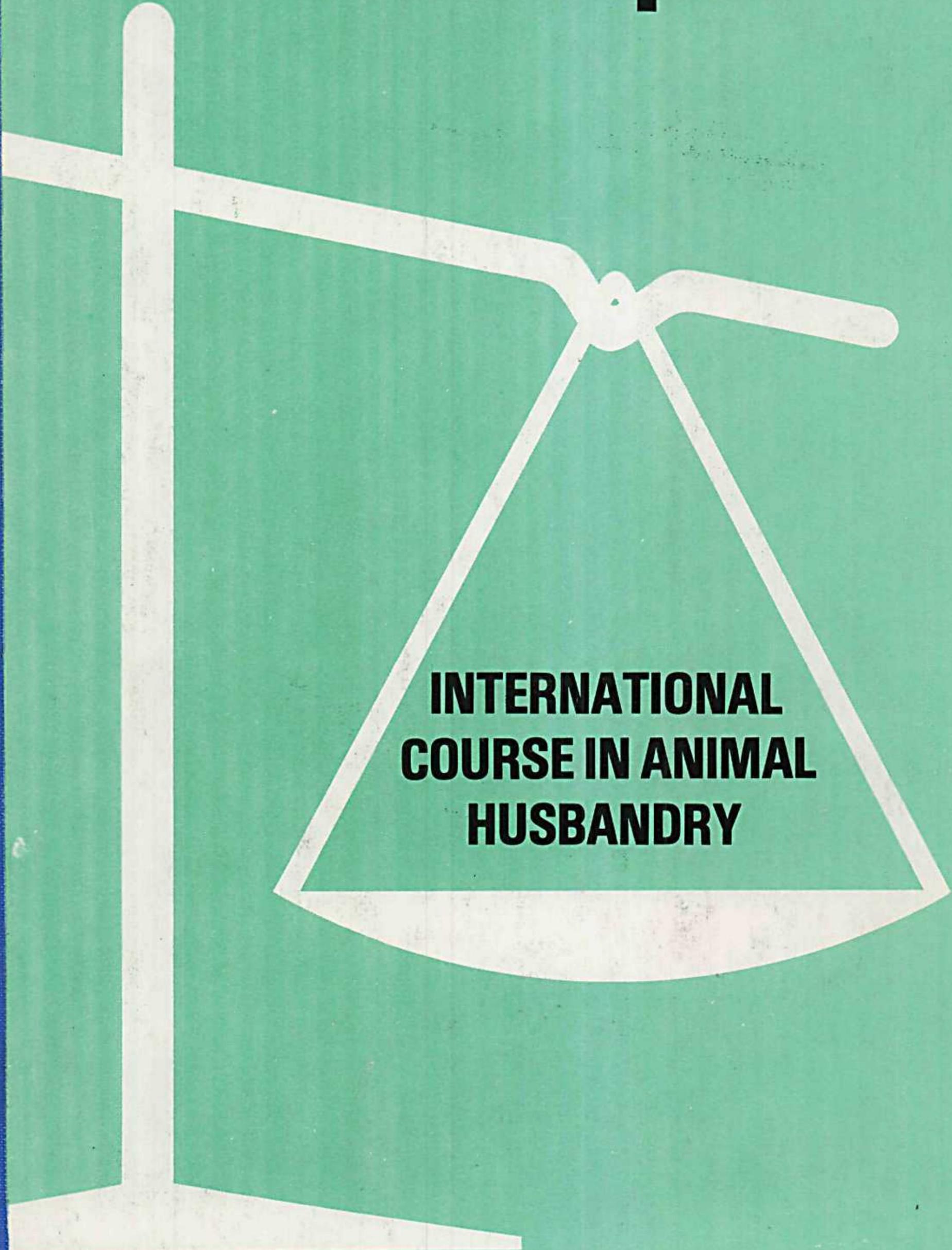




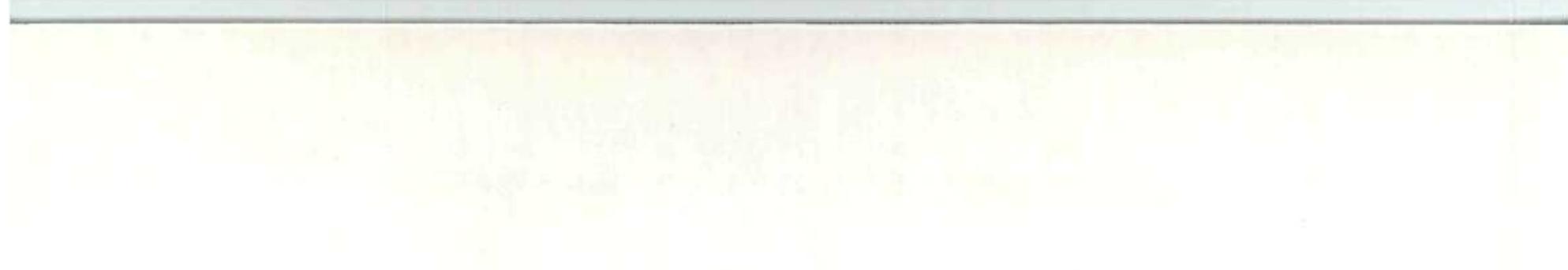
THE ROYAL NORWEGIAN MINISTRY
OF DEVELOPMENT COOPERATION

17

Evaluation Report 3.84



**INTERNATIONAL
COURSE IN ANIMAL
HUSBANDRY**



EVALUATION REPORT
on
MANPOWER DEVELOPMENT PROGRAMME and INTERNATIONAL
COURSE in ANIMAL HUSBANDRY

MAY 1984

The views and interpretations expressed
in this report are those of the authors
and should not be attributed to the
Ministry of Development Cooperation.

CONTENTS

	<u>Page</u>
1. INTRODUCTION	1
2. SUMMARY AND RECOMMENDATIONS	2
2.1 Summary	2
2.2 Recommendations	3
3. ESTABLISHMENT OF M.Sc.-COURSE IN ANIMAL HUSBANDRY	5
3.1 Background	5
3.2 The need of M.Sc. programme in Animal Husbandry at University of Dar-es-Salaam, Faculty of Agriculture, Morogoro	6
3.3 Outline for co-operative programme for staff development in animal production between Morogoro and NLH	7
3.4 Agreement and approval of co-operation	10
3.4.1 Approval of Staff Development Programme in Animal Production	10
3.4.2 Agreement of co-operation between Norwegian Agency for International Development (NORAD) and NLH	10
4. ACCOMPLISHMENT AND RESULTS OF THE M.Sc.-COURSES	10
4.1 Agreements	10
4.2 Recruitment and selection of students	11
4.3 Number of students in the course	11
4.3.1 Reasons for limitations	11
4.3.2 Distribution of students over years and countries	12
4.4 Distribution of fellowship holders on organizations/activities in Tanzania after graduation	14
4.5 Distribution of students on scientific fields for thesis research	16
4.6 The taught part of the course at NLH	17
4.6.1 The teachers opinion	17
4.6.2 The course content	18
4.6.3 The relation between the Diploma Course and M.Sc.-course	19

	<u>Page</u>	
4.7	The thesis research part of the M.Sc.-programme	19
4.8	Textbooks for the course at NLH	20
4.9	Visits by course co-ordinator and scientific staff to Morogoro or NLH	20
4.10	Social activities in relation to the course at NLH	20
5.	STAFF SITUATION AND DEVELOPMENT PLANS FOR ANIMAL SCIENCE DEPARTMENT, MOROGORO	21
5.1	Education of B.Sc.	21
5.2	Staff development plan for Animal Science Department, Morogoro	21
5.3	Future M.Sc.-programme	22
6.	BUDGETING AND COSTS FOR M.Sc. PROGRAMME	23
6.1	Annual budget proposal	23
6.2	Annual allocation for the course	23
7.	STAFF SITUATION AND DEVELOPMENT PLAN FOR ANIMAL PRODUCTION DEPARTMENT, KABETE, KENYA	25
8.	GOAL AND DESIGN OF FUTURE COURSES IN ANIMAL HUSBANDRY	25
8.1	Goal	25
8.2	Possible changes of the present international course	26
8.2.1	Continuation of the present M.Sc.-course	27
8.2.1.1	Only Tanzanian participants	27
8.2.1.2	Participants from East African countries	27
8.2.1.3	M.Sc.-course with participants from different parts of the world	27
8.2.2	Comparisons of the alternatives	28
9.	PROPOSALS FOR EXTENDED EVALUATION OF THE COURSE PROGRAMME	28
10.	REFERENCES	30

Appendixes

1. Terms of Reference for Animal Husbandry Evaluation Consultant
2. Course Descriptions for M.Sc. Course, NLH
3. Questionnaire to the students at NLH
4. Persons met by the consultant

1. INTRODUCTION

NORAD has financed a manpower development programme in animal husbandry since 1977/78. Initially, the programme was established for a four year period with the aim to assist University of Dar-es-Salaam, Department of Animal Science, Morogoro, Tanzania, in post B.Sc.-education. The programme comprised mainly the components of a 10 months fellowship course at the Agriculture University of Norway (NLH), Aas, and a fellowship period of one year in Tanzania for the students to complete the thesis, leading to a Master of Science degree.

The programme was extended in 1981, allowing fellowship holders from other countries than Eastern Africa to participate in the course. Today the course at NLH/Aas is announced as an International Course in Animal Husbandry.

In 1982 it was discussed in the NORAD/NLH Liaison Committee (Kontaktutvalget) to evaluate the whole programme.

Later it was decided by the 2nd Planning Division, Ministry of Development Cooperation, Norway, to ask a consultant to make a partial evaluation in Norway as the first step of possible follow-up project review.

The purpose of the present evaluation is spelled out in the Terms of Reference, see Appendix 1. The main objectives are:

1. Provide information and advise to central aspects of the present programme and its possible continuation.
2. Assess the value of the manpower development programme and diploma course to the manpower requirements in participating countries.
3. Investigate alternative uses of the available resources.
4. Prepare a list of main problem areas to be covered by a possible follow-up project review.

The evaluation was carried out during the period 9th April - middle of May 1984 by Professor Hans Wiktorsson, Department of Animal Nutrition and Management, Swedish University of Agricultural Sciences, Uppsala.

The evaluation consultant met and had interviews with the persons listed in Appendix 4, during April 9 - 13th 1984.

2. SUMMARY AND RECOMMENDATIONS

2.1 Summary

- * NORAD agreed in 1977 to support M.Sc.-courses in Animal Husbandry as part of a staff development programme at the Animal Science Department, Morogoro, Tanzania. The courses had to be jointly accomplished by Morogoro and the Agriculture University of Norway (NLH).
- * The first group of students was recruited in 1977 within the framework of the first 4 years agreement. The agreement was later renewed, but with participants not only from Tanzania, but from other countries, mainly from Eastern Africa and southeast Asia.
- * The M.Sc.-programme includes a 10 months taught course at NLH and a thesis research part (one year) at Morogoro. The number of students per year has varied between 7 to 12.
- * Today the course is announced and carried out as an International course in Animal Husbandry at NLH with about equal number of students from Tanzania on the M.Sc.-programme and students from other countries on a 10 months diploma course.
- * From 1977 until 1983 a total number of 70 students have been accepted; 44 from Tanzania, 14 from other East African countries, and 12 students from 8 other countries.
- * Until 1983 all students from Eastern Africa have been registered as M.Sc.-students at Morogoro.
- * So far 31 out of 35 students from Tanzania have received M.Sc.-degree. Only one out of 8 from Ethiopia, Kenya and Zambia has graduated. The failures among the students are on the thesis research part of the programme.

- * Only two of the graduated 31 students from Tanzania have been recruited to Animal Science Department, Morogoro. The rest is employed by various organizations in Tanzania.
- * The M.Sc.-courses alone have had little impact on the staff development at Morogoro, but linked activities like joint research programmes and close contacts between scientific staff and teachers at Morogoro and NLH have most probably increased the value of the programme.
- * The impression is that the courses have been very well managed at NLH. Qualified staff and specialists have been responsible for the teaching, although a few of the teachers have very limited or no experience of animal production under tropical conditions.
- * The present students at NLH wanted more teaching in applied animal husbandry and experimental design.
- * If the diploma students at NLH have had the possibility to choose between Diploma or M.Sc.-programme, all of them had chosen the later.
- * The plan of extending the teaching in animal science at Morogoro will increase the need of more qualified staff. The requirement of qualified staff might be even grater today than 10 years ago.
- * The costs for the course are double as high today as when it began 7 years ago.

2.2 Recommendations

- * It is recommended to look into the possibility to reestablish the M.Sc.-course rather than the present mixed Diploma and Master course.
- * It is recommended to continue the support of staff development programme at Morogoro.

- * It is recommended to further investigate the possibility to establish similar contacts with Animal Production Department, Kabete, Kenya. The need of qualified staff seems to be big. This may also satisfy all East Africans.

- * It is recommended to extend the evaluation of the course to the former scholarship holders in Tanzania, Kenya, Ethiopia and Zambia, particularly if it is decided to limit the participation primarily to the East African countries. Further evaluation concerning the thesis research part is also recommended.

- * It is recommended to look into the possibility to make minor changes in the taught course programme in favour of applied animal husbandry and experimental design.

- * The students ought to have sufficient book allowance to buy good textbooks.

3. ESTABLISHMENT OF M.Sc-COURSE IN ANIMAL HUSBANDRY

3.1 Background

In 1973 NORAD approved the appointment of an officer placed at the Agriculture University of Norway (NLH), Aas, with the duty to a.o. develop proposals for guidelines of the future work at NLH within the field of co-operation with developing countries. At NLH a liaison committee was nominated to support the officer. In 1974 the committee presented a report (1) in which the following four activities were particularly stressed:

- a) Courses for Norwegian students in order to rise the knowledge and interest in international agriculture, with particular emphasis towards the developing countries.
- b) Scholarship and courses for students with university degree from developing countries;
 - Preference to organized courses with groups of students with the aim to cover a defined need in the developing countries.
 - The courses shall be short (normally not exceeding one year) with the exceptions for studies in very special fields.
 - The programme shall be oriented towards the problems and conditions in the developing countries. Research programme within the courses shall preferably deal with adequate problems in the students' home country.
- c) Research and investigations in connection to aid programmes sponsored by NORAD, and in corporations with research and scientific bodies in the developing countries.
- d) Assist in the requirement of personnel for projects; assist in the establishment of institutes for research and higher education and participate in the evaluation of projects.

Early 1974 NORAD scrutinized their policy for fellowship activities. More emphasis was put on fellowships of maximum one year for specialists.

Research activities by the students should preferably be conducted in their home country. Special arrangement could be laid for staff development programmes.

Thus the policy and the interest seemed to coincide between NORAD and NLH.

3.2 The need of M.Sc. programme in Animal Husbandry at University of Dar-es-Salaam, Faculty of Agriculture, Morogoro.

Within the framework of forestry development projects in Tanzania NORAD had agreed to support a M.Sc.-programme at the Faculty of Agriculture, Morogoro, in co-operation with the Agriculture University of Norway. The programme included course work in Norway and research work for the M.Sc. thesis in Tanzania.

Based on the experiences of the forestry programme, similar intensified staff development programmes were late 1975 outlined in other fields as well (2, 3). One of them with high priority was Animal Production. The Faculty had a great need for a M.Sc.-programme in Animal Production and would like one established. The Department of Animal Science, Morogoro, was understaffed. None of the Tanzanians held the formal qualification of Ph.D.-degree. Out of established 13 posts for scientists at the Animal Science Department, 9 were filled with Tanzanians, but all in training for higher degrees, 4 in training locally and 5 in training overseas.

However, according to (2) and (3) a strong argument for a M.Sc.-programme in Animal Production was Tanzania's policy in respect of increased emphasis on animal production.

The Tanzanian Government passed a bill in 1974 which established the Livestock Development Authority (LIDA), which should co-ordinate all the livestock development programmes in the country for ranching, dairy, meat, pig and poultry production.

The aim of the livestock development programme was to rise the productivity of the large livestock resource of 14 million head of

cattle, 5 million head of goats, 2,8 million head of sheep, 18 million chickens and about 30 000 pigs, in order to make the country self-sufficient of animal products and improve the health and incomes of the people in the rural areas of Tanzania.

According to estimates based on this policy, the country needed almost 200 specialists in the field of animal production.

3.3 Outline for co-operative programme for staff development in animal production between Morogoro and NLH

In recognition of the great need of well trained Tanzanians at the Department of Animal Science, Morogoro, and in the country, the Faculty of Agriculture, Forestry and Veterinary Science, Morogoro, and the Agricultural University of Norway, Aas, established in 1975 contact in order to explore the possibilities of co-operation in staff development and research programmes at Morogoro, and training of specialist engaged in the livestock development programme in Tanzania.

According to revised programme outline (4) a M.Sc.-course in Animal Production should be established from autumn 1977.

The M.Sc.-programme aimed at admitting 8-10 students per year. The course leading to this degree should last for not less than 18 months and consist of a taught course programme part, and a thesis research part. The students were provided with scholarships for a period of two calendar years.

At NLH the students should go through a taught course programme with the objectives of:

- Strengthening the students educational and training background in animal production.
- Introducing them to methods in animal science research and experimentation.

At Morogoro the students should carry out a research project in their area of specialization, leading to a thesis for a M.Sc.-degree at University of Dar-es-Salaam.

Specialization opportunities like ruminant nutrition and feeding, fodder conservation, dairy herd management, beef production, monogastric nutrition, feed formulation, poultry or pig production, breeding programmes for domesticated animals, etc. were provided only through the thesis research part.

For each group of students the required courses were offered during a period of approximately 10 months. During this period, the students prepared for their thesis research through literature studies in the relevant fields and by planning for field experiments and other data collection exercises, and by writing of a research project outline.

A summary of the courses at NLH with course No and name, student/teacher contact hours and No of course credit is given in Table 1. Detailed course descriptions are given in Appendix 2. The courses as presented in the Table and Appendix were outlined in 1977, and they are still almost identical.

With the exception of the course A 1, the departments responsible for the teaching and the courses at NLH are

- Department of Animal Genetics and Breeding
- Department of Animal Nutrition and Feeding
- Department of Poultry and Fur Animal Science.

It was agreed already from the beginning that if the course is not fully utilized by Tanzania, nationals of other developing countries may be admitted. It was understood that students from other countries should register for M.Sc. at Morogoro. The thesis research should either be carried out in Tanzania or in the home country of the students, if supervisors were available.

A course leader should be nominated at Morogoro as well as at NLH.

Table 1. Summary of taught course programme, NLH.

Course No.	Name of courses to be given	Subject matter of University of Dar-es-Salaam courses included	Student/teacher contact hours	No. of course credit
A1	Mathematical statistics, experimental design in animal science studies, data processing.	AS 416	90	2
AS 1	Basic animal nutrition: Biochemistry Chemical feed analyses Feed evaluation	AS 401 AS 407	90	2
AS 2	Population genetics and animal breeding	AS 406	60	2
AS 4	Feeding and management of ruminants Cattle Sheep and goat	AS 410 AS 411 AS 413	60	2
AS 5	Feeding and management of monogastric animals Pigs Poultry	AS 412	30	1
AS 6	Applied animal breeding of different species	AS 404	60	2
AS 7	Outline of research programme			

From Revised Programme Outline, 1977.

3.4 Agreement and approval of co-operation

3.4.1 Approval of Staff Development Programme in Animal Production.

The Senate of the University of Dar-es-Salaam approved in May 1977 the Co-operative Programme for Staff Development in Animal Production as scheduled in the Revised Programme Outline (4).

3.4.2 Agreement of co-operation between Norwegian Agency for International Development (NORAD) and the Agricultural University of Norway (NLH).

A general agreement of co-operation between NORAD and NLH was signed in January 1977.

NLH agreed a.o. to assist NORAD with design and realization of courses, development programmes, seminars etc. for staff from developing countries.

NORAD agreed to cover the actual costs for the activities.

It was agreed to establish a NORAD-NLH liaison committee (kontaktutvalg). The committee had to discuss the extent and design of NORAD's fellowship programme and put forward annual budget proposals for the activities.

The first agreement of three years duration has been renewed and is still valid.

4. ACCOMPLISHMENT AND RESULTS OF THE M.Sc.-COURSES.

4.1 Agreements

The first students were recruited to begin their studies at NLH in 1977. The first agreement covered a four years period, which meant recruitment of the last group of students in 1980, and finish in 1982.

However, when it in 1980 appeared obvious that the staffing situation at Animal Science Department, Morogoro, had not improved to the

intended extent, the University of Dar-es-Salaam requested late 1980 for an extension of the existing agreement for another period. NORAD agreed to continue the programme with two more groups of students, but with students not only from Tanzania and Eastern Africa, but from other developing countries as well.

Since then the course seems to have been extended without formal agreement between the participating bodies (NORAD, NLH and Morogoro) and is now announced and carried out as an International Course in Animal Husbandry at NLH with participants from Tanzania on a M.Sc.-programme and students from other countries on a 10 months diploma course. A new course (No. 8) will commence 20 August 1984.

4.2 Recruitment and selection of students

According to the first agreement, selection of students, award of scholarships, registration as M.Sc. students and award of the degree should be the responsibility of the Faculty of Agriculture, Morogoro. Students accepted for the programme should be holders of a good first degree (B.Sc.) in agriculture or in veterinary science.

In reality, selection of students from Eastern Africa seems to have been a joint task for Morogoro and NLH. The principals for the selection of students for the present joint M.Sc.- and international diploma course seems to be somewhat unclear, and reflect the situation of a not well-defined goal stated in a mutual agreement. The distribution between Tanzanian (East African) students and the rest, or rather M.Sc.- and Diploma- students is obviously more a result of limited supervision capacity for the thesis research part at Morogoro than a goal to have about equal number of Master and Diploma students, which has been the case since the 1981 recruitment.

4.3 Number of students in the course

4.3.1 Reasons for limitations

It was stated in the programme outline for the first agreement (1977)

that 8 to 10 students per year was an ideal number. The limitations were: number of qualified candidates, supervision capacity at Morogoro and space for lab. practices at NLH.

The number of students accepted to the taught course programme at NLH has been increased to 12, which is said to be the upper limit under the present teaching conditions.

4.3.2 Distribution of students over years and countries

From 1977 until 1983 a total number of 70 students have been accepted. In Table 2 is given a summary of the distribution over the years and countries. During the first four years all but one or two students per year came from Tanzania. However, in 1978 it was not possible to find enough qualified candidates to fill up the course to the agreed number.

After the initial four years period the number of students from Tanzania became reduced to about half, and has been less than 40 per cent of the total for the last three years.

Out of the 44 students from Tanzania, 31 of them have so far finished their studies with M.Sc.-degree. The last two years students are still on the course, either at Morogoro or at NLH. It means that 89 per cent of the students (31 out of 35 from the years 77/79 to 81/83) managed to receive M.Sc.-degree, which must be regarded as a good result. The failures are on the thesis research part of the course.

In all 14 students from other east african countries (Ethiopia, Kenya and Zambia) have been admitted to the course. Most of them are from the last three years recruitment. However, the attempt to register these students at the University of Dar-es-Salaam and complete their studies with the thesis research at Morogoro has not been successful. Only one out of 8 has graduated. The reason for this failure is not known to me. The last year's students (1983) from Ethiopia and Zambia are not even registered for M.Sc.-programme at Morogoro, but on the diploma programme (only the 10 months course in Norway).

Table 2. Students enrolled in the M.Sc.-course (Int. Diploma Course) on NORAD scholarship.

Year Begin	Due to finish	Tanzania		Kenya	Ethio- pia	Zambia	Bangla- desh	Filippi- nes	China	Burma	Sri Lanka	Jamaica	Mexi- co	Thai- land	Total
		Began	Compl. M.Sc.												
1977	1979	8	8												8
1978	1980	5	5	1		1									7
1979	1981	9	7			1									10
1980	1982	9	8	1	1										11
1981	1983	4	3		1	2	1	1	1						10
1982	1984	4			1	1	1	2	1	1	1				12
1983	1985	5			1	3						1	1	1	12
T O T A L		44	31	2	4	8	2	3	2	1	1	1	1	1	70

In addition two students from Kenya have been on individual M.Sc. programme during this period (77/79 and 81/83). One of them has so far taken the M.Sc.-degree.

Of the remaining 12 students admitted to the diploma course during the last three years, 10 of them came from 6 different south-east asian countries and one each from Jamaica and Mexico.

4.4 Distribution of fellowship holders on organizations/activities in Tanzania after graduation

As stated in the programme outline for the M.Sc.-course the goal was to educate Tanzanians for staff positions in the Department of Animal Science, Morogoro, and for the animal production services and industries established by the Tanzanian government.

The distribution of former fellowship holders on organizations or activities in Tanzania is given in Table 3. As clearly can be seen from the Table, the impact on the staffing situation at the Animal Science Department, Morogoro, has been very limited, as only two former fellowship holders from the first year's course have been recruited. The remaining 29 are at present engaged within research organizations (TALIRO and Uyole Agriculture Centre), at training institutes as teachers, with the extension service, with the Ministry, or with livestock production companies, mainly as herd managers. The last group is the biggest with 13 former fellowship holders out of 31.

Although not clearly stated in any document seen, it seems most likely that it was anticipated that more fellowship holders should have positions at the Animal Science Department after graduation. Conclusions drawn from the Table are that the M.Sc.-programme alone has had little impact on the staff development so far, but linked activities like joint research programmes and close contacts between scientific staff and teachers at Morogoro and NLH have most probably increased the value.

The present staff situation and future plans for the Animal Science Department, Morogoro, is discussed in a later chapter.

Table 3. Distribution of former fellowship holders on institutes and activities in Tanzania as per April 1984.

Year	Animal Sci. Dept. Morogoro	Research	Teaching	Extension	Ministry	Parastatles		Total
						Manager of herd etc.	Administr.	
1977-79	2	2				4		8
1978-80			1		1	2	1	5
1979-81		1	1	2		2	1	7
1980-82		3		1	1	3		8
1981-83				3				3
T O T A L	2	6	2	6	2	11	2	31

The majority of the M.Sc. holders are engaged within those fields (parastate organizations and research activities), which besides the Faculty were identified target groups in the programme. The impact of the training programme in these fields has to be investigated in a special evaluation if it has to be documented.

4.5 Distribution of students on scientific fields for thesis research

The programme provides specialization opportunities for the students in the thesis research part, primarily on Animal Breeding and Animal Nutrition, including feed research. The impression is that the students have had opportunity to make their own choice with regard to their interest.

Out of all Tanzanian students (45 in all), 9 have specialized in Animal Breeding and 36 in Animal Nutrition. (Table 4).

Table 4. Distribution of Tanzanian students on Animal Breeding and Animal Nutrition for thesis research.

Year	Animal Breeding	Animal Nutrition
1977-79	3	5
1978-80		6
1979-81	2	7
1980-82	2	7
1981-83		4
1982-84	1	3
1983-85	1	4 (prel.)
In all	9	36
% distribution	20	80

Whether the distribution has been ideal from Tanzanian requirement point of view is difficult to confirm. However, it is stated already before the first course (1977) that the biggest need is within the field of animal nutrition and feed supply and it is certainly no risk that there should be a surplus of qualified staff in animal nutrition within the country.

It is a generally agreed opinion that the most common limiting factor for improvement of animal production in developing countries is the nutrition, and particularly its application in cattle production. Thus it does not seem recommendable to change the course in the direction of animal breeding and poultry production, which once was proposed in the Liaison Committee (No 21, March 2, 1982).

4.6 The taught part of the course at NLH

4.6.1 The teachers opinion

Almost all of the teachers on the present course were interviewed during my visit to NLH. Many of them have been engaged in all or almost all M.Sc.-courses held. Very qualified staff and specialists have been responsible for the teaching in their field of specialization. However, a few teachers have very limited or no experience of animal production under tropical conditions, which probably is a constrain when it comes to the applied part of the courses. This was expressed by the teachers themselves as well as the present students at NLH.

The three Animal Science Departments (Animal Genetics and Breeding; Animal Nutrition and Feeding; Poultry and Fur Animal Science) have all the time been compensated for the teaching and supervision. At present NORAD pays equivalent to four positions (2 academic, 2 technical) to the departments.

The teachers expressed different opinions about the teaching and the compensation. There is no doubt that the big engagement of the highly qualified staff at the departments somewhat guarantees a high academic level, but will easily increase the working load above ordinary working hours if they also want to continue with scientific work.

The total teaching load, including courses for and supervision of Norwegian and other students might be different between the three departments, thus explaining that somewhat more concern was expressed among teachers met in the Animal Nutrition and Feeding Department than in the two others.

It could be looked into if other ways of compensation are desirable.

4.6.2 The course content

The outline of the courses at NLH has been almost unchanged throughout the years.

The courses in mathematical statistics were not thoroughly scrutinized by the consultant, but the present students at NLH expressed some concern about the part covering experimental design. They wanted it more animal science-oriented. It would be worthwhile to investigate the possibility of closer links, particularly to the applied experiments in the Animal Science Departments.

A system, which e.g. allowed the students to follow a few experiments of different but typical design, preferably applied studies in the Animal Science Departments throughout the year at NLH, should give the students valuable experiences, not only in experimental design, but also in the art of carrying out experiments.

According to the results of a questionnaire (see Appendix 3) to the present students at NLH the majority of them wanted more training in applied animal breeding, applied animal nutrition as well as feeds and feed technology. The practical exercises in animal husbandry during one month (one week each for feeding and management of cows, goats, pigs and poultry), which have been included in this year's course is a good attempt to improve the understanding and knowledge of applied animal husbandry. Whether this to some extent could be integrated into applied experimental work (experimental design) might be worthwhile to investigate.

It was a general opinion among the teachers that the academic level of the taught courses should be equivalent to the courses for the Norwegian students. The students' experience and knowledge were sometimes a pronounced limiting factor to be able to reach the goal. The knowledge and understanding of the applied animal husbandry were particularly limited.

4.6.3 The relation between the Diploma Course and M.Sc.-course

As previously mentioned, the combination of the International Diploma Course and the M.Sc.-course into the same taught course programme, seems to have been done without a thorough analysis of the goal and requirement for the diploma course. If the diploma students have had the possibility to choose between Diploma or M.Sc.-programme, all of them had chosen the later (see questionnaire Appendix 3).

As Diploma students they preferred a more specialized course in their field of work.

4.7 The thesis research part of the M.Sc.-programme

During their stay in Norway, the M.Sc.-students have had to write a project write-up for their thesis research. This means, that they have to have assurance about the field of work and specialization. This has not been a problem and is also confirmed by the present students, who all have their plans for the research confirmed.

However, only one of the five has made any preparations so far. There are indication that individual students have had to wait several months after return to Morogoro before the research project has commenced. The delay may have had different reasons, but will affect the date of graduation.

It might be worthwhile to further investigate the reasons for the rather common delay in finishing the thesis as compared to the planned date. It can be due to delay with the research work, with the writing of the thesis, or with the examination.

The research findings have only occasionally been published in official journals. A single investigation might be of limited extent and quality, but can be included as a part in a bigger project, and thus contribute to the scientific work at the Animal Science Department or elsewhere. The attempt to include a couple of students in a joint Morogoro-NLH research project, presently run at Morogoro, with dairy goats on different kinds of feeds, is a very good example of how this can be done.

4.8 Textbooks for the course at NLH

Relevant literature and textbooks are used and recommended to the students in most of the subjects at NLH. There are, however, certain fields where the problems to find relevant textbooks are obvious.

It was noted that the students sometimes only borrowed the books instead of buying them. To my mind a well recognized textbook, almost of reference type, is one of the most important resource for a student, and particularly for students from developing countries, where shortage of literature, journals etc. is very pronounced. The book allowance - for 1984 is allocated 1750 NKR per student - is to my mind too small, and do not even allow the students to buy one good textbook for each course. Books have become rather expensive as such, but as long as this expense is less than one per cent of the total - and might bring the most durable knowledge - the book allowance should be reconsidered by the authorities.

4.9 Visits by course co-ordinator and scientific staff to Morogoro or NLH

According to the original agreement a course co-ordinator should be appointed at each one of the two places Morogoro and NLH.

The co-ordinator at NLH has annually paid a visit to Morogoro and to other places in Tanzania where the students have been working with their thesis. Other teachers and scientific staff at NLH have also occasionally visit Morogoro, either as external examiners or for scientific work on joint projects.

The possibilities for the co-ordinators and others to visit the places are very valuable. Joint research projects shall be encouraged. They can in many cases successfully be used as basis for the thesis research work.

4.10 Social activities in relation to the course at NLH

During the first period of the course agreement, a welfare officer from Oslo was given the responsibility of helping the student with

social activities and act as a contact person. During the last years an officer at the joint NORAD - NLH office, Aas, was appointed as successor.

The Master and Diploma students at NLH expressed their great satisfaction with the present arrangement and the social events, which were arranged during their stay at Aas.

5. STAFF SITUATION AND DEVELOPMENT PLANS FOR ANIMAL SCIENCE DEPARTMENT, MOROGORO

5.1 Education of B.Sc.

It has been decided to change the present education system for students at Morogoro from B. Agriculture Sc. with options in animal science to a specialized education for B. Animal Sc. The change will commence 1985. At present the number of students with options in animal science is about 10 per year. It is planned to accept 20 students on the new specialized 3 year's programme.

This change will substantially increase the teaching load for the staff at the Department of Animal Science.

5.2 Staff development plan for Animal Science Department, Morogoro

One of the main argument for the M.Sc.-course programme, when it once started, was the great need of qualified staff at Animal Science Department, Morogoro. The need was obvious in 1975 as can be seen from Table 5.

Table 5. Staff situation at Animal Science Department, Morogoro

	<u>1975</u>	<u>1984</u>	<u>Planned 1985</u>
Established posts	13	27	35
Posts filled with Tanzanians	9	16	
Holders of Ph.D.	0	4	
In training, M.Sc. and Ph.D.	9	8	

During the 10 years, from 1975 to 1984, the number of established posts at the Department has been doubled, and 8 more posts will be established when the Department will have its own education for B.Sc. At present three out of four professors positions are vacant (the fourth is at the same time Dean at the Faculty).

Thus it seems obvious that the requirement of qualified staff at the Department might even be greater than 10 years ago. According to Dr. M. Mgeni, the present head of Animal Science Department, attempt is made to hire a couple of qualified foreign scientists on local contracts.

Any other possible sponsor for a development programme at Morogoro has not been mentioned.

5.3 Future M.Sc.-programme

The need of M.Sc.-programme at Morogoro is obvious and was clearly expressed by the Head of Department. However, with regard to the present situation, it is not possible for the Department to take over also the course part of it for the time being unless the Department is substantially sponsored. This has several times been discussed.

With the expanded scientific and teaching responsibility for the Department it was expressed wishes of not only continuation of the present programme, but also possibilities of sending their own staff to a recognized university for M.Sc. training in e.g. ranch management and dairy technology.

What is said about the future need of training of staff at the Department is most probably relevant also for other livestock development authorities in Tanzania.

Fellowships for M.Sc.-studies have been offered to Tanzanians by other aid organizations during the last 7 years as well. The biggest sponsor has probably been US AID. It is estimated that appr. 20 students have been sponsored on US AID programmes, particularly in ranch management.

Individuals have been trained on other programmes as well, often in relation to a development project.

Thus with regard to the need of a continued staff development programme for Animal Science Department the M.Sc.-course is just as warrant today as 7 years ago.

6. BUDGETING AND COSTS FOR M.Sc. PROGRAMME

6.1 Annual budget proposal

Annual budget proposal has been prepared by the course co-ordinator and NORAD/NLH Office, Aas, and discussed in the NORAD-NLH Liaison Committee before the end of October each year. This procedure seems to have been followed fairly well.

The budget proposal has then been sent to NORAD for approval. Confirmation of approval should be sent back before first of January, when the new financial year begin. NORAD has made the decision and informed NLH in due time every year except the last two, when minor delays have occurred. This year the NORAD/NLH Office was informed by letter February 28.

6.2 Annual allocation for the course

In Table 6 is given a summary of the annual allocation of money for the course, according to approved budgets. For the compensation to NLH is only included the allocation to the three Animal Science Departments, while the costs at Math. Statistic Department and overhead costs are not included.

The total annual costs for the course have almost doubled from 1978 to 1983. This is somewhat more than the average cost index increase during the same period, but coincide very well with the overall increase in total amount of Norwegian aid during the same period. The increases in the costs for the course are very similar for all cost components. The major costs are fellowships and compensations to the departments at NLH.

As indicated in the Table the costs increase seems to be high in 1984. The reduced number of students completing their M.Sc.-thesis research at Morogoro is not fully reflected in the cost development at Morogoro.

Table 6. Costs for Animal Husbandry Course, according to approved budgets, 000 NOK.

Year	No. of students		Fellowship	Air tickets	Book allow. II	Clothing allow. II	At NLH				At Morogoro				Total		
	I (old)	II (new)					Study tours	Educ. mat.	Comp. to inst. at NLH	Progr. coord. NLH travel.	Total at NLH	Fellowship	Research grant	Travel cost, coordinator		Super-numerary sci. staff	Total at Morogoro
1978	10	8	260	90	10	16	10	10	299	15	334	52	33	15	26	126	836
1979	8	10	240	80	10	18	10	317	30	367	35	28	18	30	111	826	
1980	10	11	314	110	10	19	10	275	35	330	72	42	22	54	190	977	
1981	11	10	348	130	10	20	10	390	35	445	182	116	24	54	376	1335	
1982	10	12	400	134	17	22	15	508	35	575	90	46	24	54	214	1362	
1983	12	12	576	158	20	31	18	542	40	620	100	51	35	54	240	1643	
1984	12	13?	609	180	20	?	57	614	40	731	225	105	32	54	416		

Excl. costs at NORAD-NLH Office and the statistic course.

Source: Archive at NORAD-NLH Office and Fellowship Division, NORAD.

7. STAFF SITUATION AND DEVELOPMENT PLAN FOR ANIMAL PRODUCTION DEPARTMENT, KABETE, KENYA

The consultant has limited experience of his own concerning the staff situation and development plan for Animal Production Department, Kabete.

It should be reminded that NORAD sponsored a development programme at Kabete until 1978, and that NLH/NORAD had had discussions with Kabete about a staff development programme of similar kind as later was agreed upon between Morogoro, NLH and NORAD (1977).

Animal Production Department has at present its own M.Sc.-programme. However, the staff situation seems to be similar to Morogoro. They have difficulties to appoint qualified candidates for the posts. At present 4 out of the 15 posts at the Department are vacant. Of the 11 staff members only 5 are Kenyans. (Fossum, pers. com.)

It has not been possible to find any document indicating the need of a M.Sc.-programme for research organizations, livestock production units etc. in Kenya.

If interest exists a joint M.Sc.-programme between NLH and the two east african countries should most probably be of great advantage, taking into account the experiences and policies for the participating universities.

8. GOAL AND DESIGN OF FUTURE COURSES IN ANIMAL HUSBANDRY

8.1 Goal

A Master or Diploma Course in Animal Husbandry has to fulfil the goals within two different divisions at NORAD.

Within Agriculture and Rural Development Division the main target group for Norwegian aid is expressed to be the average man and woman in rural areas.

Providing aid for higher education within animal production will

result in better knowledge and understanding of possible ways for development of the livestock sector in a country.

Thus leading in the second instance to a possible development within the target group.

The main criteria for a fellowship programme with courses in Norway was expressed to be

- a) that the topic is of great importance for the developing country, and
- b) that special knowledge and competence is available in Norway.

The fellowship holders shall primarily come from the main partner countries.

In these respects Norwegian aid policy will very well support the idea of a M.Sc.-course in Animal Husbandry and also combined with a staff development programme.

However, the present international course with both Master and Diploma students has no pronounced target group and expressed goal for the diploma students.

There is no doubt but the present students in the diploma course wanted to participate in the M.Sc.-course. The impact on the development of single fellowship holders from different countries without links to Norwegian-sponsored or otherwise known development projects can be questioned.

8.2 Possible changes of the present international course

It is my opinion that a well managed course with good reputation has all reasons to continue within a field where the need is great.

However, the design of the present taught course means that it has its special strength as a scientific oriented M.Sc.-course. Therefore alternatives to the present International Animal Husbandry course should be looked into.

I did not find any expressed interest among the participating departments at NLH to arrange special designed diploma courses.

8.2.1 Continuation of the present M.Sc.-course

8.2.1.1 Only Tanzanian participants.

This is, however, not an ideal model mainly because of limited supervision and research resources at Morogoro as well as the difficulties to find enough qualified candidates of 10-12 students per year. A reduced number to 5-6 per year, which might be the ideal number with regard to supervision at Morogoro, will increase the cost per student in Norway.

With regard to other teaching and supervision responsibilities at Morogoro it is not realistic to believe that the whole course can be moved to Tanzania at least during the coming 2-3 years.

8.2.1.2 Participants from East African countries.

The attempt to register students from other East African countries at Morogoro was almost a complete failure. However, the idea to recruit the students from a limited zone with somewhat similar conditions is certainly worth to consider.

As mentioned in chapter (7.) the Animal Production Department at the College for Veterinary Medicine and Animal Science, Kabete, Kenya, could be a good alternative to extended contact with another university in the zone. The fact that Kabete already has an established M.Sc.-course should not limit the possibility, but may require certain arrangements.

The two universities (Morogoro and Kabete) would then be enough basis for the thesis research part of the education.

8.2.1.3 M.Sc.-course with participants from different parts of the world.

This design will require contacts with many universities, and it is not likely that such an arrangement will be successful because of the problems with information to and supervision of the students and the need of extended contacts with the scientists and teachers at the universities in question.

8.2.2 Comparisons of the alternatives

A simple comparison of the three alternatives mentioned in 8.2.1.1 - 8.2.1.3 clearly indicate that the alternative with participants from Eastern Africa, and Morogoro and Kabete as the basis primarily for the thesis work is the most attractive one. This will allow the students to conduct their thesis work in a geographical zone similar to their own. This will very well co-inside with the idea of the Norwegian aid policy for course programmes.

9. PROPOSALS FOR EXTENDED EVALUATION OF THE COURSE PROGRAMME

It is obvious that the present evaluation does not in depth scrutinize the part of the course programme outside Norway, as well as the impact of the course outside the Animal Science Department, Morogoro. That was not the intension either, as stated in the Terms of Reference.

An extended evaluation should mainly focus on the implementation and impact of the M.Sc.-course in Tanzania.

At Morogoro questions in relation to the thesis research are of interest. Plans, preparation, implementation and supervision of the research work have to be looked into as well as the procedure in finishing of the thesis.

As almost all Tanzanian scholarship holders are working at other places than at Morogoro, it would be of great interest to send a questionnaire to all former scholarship holders. An interview with the major employers is also important.

If at the same time looking into the conditions for future development programme, the need of further training of employees at the major organizations has to be considered.

A thorough analysis of the development plan for Animal Science Department is necessary.

It seems worthwhile to prepare and send a questionnaire to the former scholarship holders from Ethiopia, Kenya and Zambia. This may give information about the impact of the training as well as information about

problems related to the thesis research part of the programme, which never was finished.

It is most likely not worthwhile to send any questionnaire to the individuals from the different Asian countries.

10. REFERENCES

- (1) Utredning om langsiktig engasjement i internasjonalt lantbruk. Norges landbrukshøgskole, September 1974.
- (2) Kyomo, M.L. The livestock industry of Tanzania 2.12.75.
- (3) Oland, K. Report, Faculty of Agriculture and Forestry, Morogoro, Visit 26/11 to 2/12-75.
- (4) Revised programme outline. Faculty of Agriculture, Forestry and Veterinary Science, Univ. of Dar-es-Salaam and Agricultural Univ. of Norway. Cooperative Programme for staff development in Animal Production. 1977.
- (5) Archive for M.Sc.-course in Animal Husbandry at 2nd Planning Division. Ministry of Development Cooperation, Oslo.
- (6) Archive (part of) for M.Sc.-course in Animal Husbandry at Fellowship Division, Technical Assistance Department, NORAD, Oslo.

TERMS OF REFERENCE FOR ANIMAL HUSBANDRY EVALUATION CONSULTANT

I Background

NORAD has financed a manpower development programme in animal husbandry since 1977/78. Initially, the programme was established for a four year period with an aim to assist University of Dar es Salaam, Institute of Animal Husbandry, Morogoro, in post B.Sc.-studies. It comprized of two main components:.

- a) a 10 months fellowship course at NLH/As
- b) a fellowship period of one year duration at the Institute of Animal Science in Tanzania, leading to MsC exam.

When the first four year programme period terminated in 1981/82, fellowship holders from other countries were allowed to participate in the course, and the course is to-day announced as an International Course in Animal Husbandry.

Expenditure for the course component of the programme for 1983 was about 1,400,000 NOK, and the Tanzanian component 240,000 NOK. Presently there are 12 fellowship holders at NLH/As. This gives an average cost per manmonth of about 11,700 NOK for the course operational cost only. In addition comes fellowships, travels, introduction course etc.

II Mode of Work

The evaluation consultant shall collect information:

1. by interviewing "resource persons" at NLH/As (personnel at the NORAD/NLH Office, the Programme Coordinator, Teachers, fellowship holders etc.), in NORAD (the

Fellowship Division, LADU, personnel responsible for education etc.).

2. by analysis of existing documentation of the programme in the NLH and NORAD archives.

III Tasks of the evaluation consultant

The evaluation consultant shall:

1. provide information and advice to central aspects of the present programme and its possible continuation. Due consideration should be given to Norwegian aims for development assistance in general and development assistance within agriculture in particular, as well as to the issue of efficient use of economic and manpower resources.
2. Assess the value of:
 - a) the manpower development arrangement during the first four year of the programme
 - b) the international diploma course

to the manpower requirements within animal husbandry in participating countries.
3. Investigate alternative uses of the available resources with a view to greater developmental impact, by redistributing the resources to alternative training institutions in developing countries, in particular Tanzania and Kenya.
4. Prepare a list of main problem areas to be covered by a possible follow-up project review of the course/programme.

IV Reporting

A report in the English language is to be submitted to
The Ministry of Development Assistance before 7 May 1984.

Helge Kjekshus
Head 2nd Planning Division.

Course Descriptions for M.Sc. Course, NLH

(Source: Revised Programme Outline, 1977).

A 1. Mathematical statistics

Review of: Description of materials, probability, statistical distribution, confidence interval, and Student t-test.

Chi-square test.

Experimental design and analysis of variance, complete randomization, randomized block, factorial, latin square, and split plot design. Planning of experiments.

Regression and correlation, linear and multiple, with test of significance.

Sampling theory, simple random and stratified random sampling.

Introduction to electronic data processing. The use of statistics in population genetics, animal breeding, and feeding of livestock.

AS 1. Basic animal nutrition.

Biochemistry, chemical feed analysis, feed evaluation

Chemical properties of carbohydrates, fat and protein.

Protein quality. Vitamins and minerals. Digestion and absorption. Digestibility determination. Energy and protein balances. Intermediary metabolism.

Chemical analysis of feeds. Feed evaluation systems.

Metabolizable energy, net energy. Use of digestibility studies and feeding trials as a means of feed evaluation.

AS 2. Population genetics and animal breeding.

1. Basic population genetics on the single gene level.
2. Description of populations with respect to quantitative traits.
3. Phenotypic and genetic parameters.
4. Selection. Aids to selection. Construction of selection indexes. Indirect selection. Response to selection.
5. Breeding methods.
6. Techniques in animal breeding research. Evaluation of results.

AS 3. Conservation methods: Field drying, barn drying and ensiling. Ensiling processes. Treatment of low quality roughages. Feed processing. The value of various roughages in meat and milk production.

AS 4. Feeding and management of ruminants

Cattle: Nutrient requirements for maintenance, milk and meat production. Ration for dairy cattle and young stock for replacement and beef production. Grazing and indoor feeding. Potential of forages in milk and meat production. Housing, feeding and management of cattle. Milking and milk handling. Meat production systems for cattle, bulls, steers and heifers.

Sheep and goat: Nutrient requirement for sheep and goats. Grazing and supplementary feeding of conserved forages outdoors and indoors. Carcass quality. Housing, feeding and management for improved milk and meat production.

AS 5 . Feeding and management of monogastric animals

Energy requirement for poultry and pigs. Sources of feed. Feed intake. Housing, handling and ration formulation. Methods of production for pigs, chicks, laying hens, turkeys, ducks and geese. Environmental factors. Hygiene problems.

AS 6. Applied animal breeding of different species

Breeding and selection in dairy and beef cattle, sheep, goats swine and poultry, including:

1. Brief description of the major breeds.
2. Reproduction.
3. Recording and testing procedures.
4. Inheritance of the most important traits.
5. Breeding plans.

AS 7 Research programme outline

Definition of the objectives. Review of relevant literature. Detailed descriptions of the methods to be applied. Animals, feeds, equipment and facilities required. Procedure for sampling, chemical analyses and computation and evaluation of results.

Implementation of the Programme

The Department of Animal Production and the Faculty of Agriculture will submit the Programme to its Faculty Board for approval, and subsequently the syllabus will be submitted to the Senate of University of Dar-es-Salaam for approval.

The Agricultural University of Norway will submit the programme to the Board of the Departments concerned for their approval, and place the request for financing with NORAD.

The formal agreement to implement the programme will be through exchange of letters between the Vice Chancellor of the University of Dar-es-Salaam and the Rector of the Agricultural University of Norway, with copies of these letters to NORAD, Oslo.

The first students will be admitted in 1977 for arrival at Aas, Norway, during August of that year.

.1 Husbandry Course Evaluation

NORAD Consultant

13.4.84

Questionnaire to present students on Int. Course, Animal Husbandry

Questions	Answer	
	M.Sc.- students	Diploma- students
1. Number of students present	5	6
2. For how many years have you worked after your first degree		
< 1 year		
1 < 2 years	2	
2 < 5 years	2	3
5 < years	1	3
3. What is your main duty		
Teaching	2	3
Research	1	
Tut. at Univ.	1	
Extension		2
Herd manager		1
Milk A.I. Rec.	1	
4. Will you return to similar job after the course		
Yes	4	6
No	1	
(For "No"-answer Teaching → → Research)		
5. Is the content of the course according to your expectation		
Yes	2	2
No	2	3
Don't know		1
6. According to your interest would you like to have changes in the teaching of:		
Basic Animal Breeding		
More	2	2
No change	2	2
Less		
Applied Animal Breeding		
More	3	5
No change	1	
Less		
Basic Animal Nutrition		
More	3	2
No change	1	2
Less		1

Questions		Answer	
		M.Sc.- students	Diploma- students
Applied Animal Nutrition	More No change Less	5	5 1
Feeds and Feed Technology	More No change Less	3 1	4 1
7. For Diploma students only			
a) If you choose between the Diploma or the Master programme would you prefer:	Diploma Master		6
b) Would you prefer more specialized course in your field	Yes No		6
8. For Master students only			
Have any plans and preparations for your research project been made			
a) Plans	Yes No	5	
b) Preparations	Yes No	1 4	

PERSONS MET BY THE CONSULTANT

Ministry of Development Cooperation

Mr. H. Kjekshus 2 Planning Division
 Mr. A. Wirak 2 Planning Division

NORAD

Mr. O. Lindstad Agriculture and Rural Development Div.
 Mr. G. Bøe Technical Assistance Department
 Mrs. R. Anderssen-Rysst Fellowship Division

Norwegian University of Veterinary Science

Prof. K. Fossum

NORAD/NLH Office, Aas

Dr. H. Kolshus NORAD/NLH Office
 Mr. Ch. Haugum " "

Agriculture University of Norway

Prof. O. Syrstad Dep't Animal Breeding
 Prof. A. Ekern Dep't Animal Nutrition
 Prof. N. Kolstad Dep't Poultry Science
 Dr. O. Saue Dep't Animal Nutrition
 Dr. Nedkvitne - " -
 Dr. Lysø - " -
 Mr. P. Lindstad - " -
 Mr. E. Thuen - " -
 Mr. O. Herstad Dep't Poultry and Fur Animal Sci.
 Mr. Bentsen - " -
 Dr. N. Standahl Dep't Animal Breeding and Genetics

Faculty of Agriculture, Forestry and Veterinary Science, Department of Animal Science, Morogoro

Dr. M. Mgeni Head of Department (visit Aas)

Former Fellowship holder

Mr. Mutaqwaba Herd manager, Iwambi, Mbeya, Tanzania
 (visit Aas)

The present Master and Diploma students at NLH.



