EDUCATION AND TRAINING FOR ANIMAL GENETIC IMPROVEMENT IN THE TROPICS

EDUCATION AND TRAINING FOR ANIMAL GENETIC RESOURCES IN AFRICA

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Improving the efficiency of livestock production is nowadays a very important issue in the world, especially in third world countries. Such programmes are based essentially on the improvement of indigenous breeds either through selection or cross-breeding. These can only be achieved if the programme is supervised by well-trained technicians. Education and training of these technicians should be organized to meet the needs of specific regions.

Training and education programmes should be based on the answers to the following questions.

1. What are the needs of the region in terms of animal genetic resources?
2. Who are the people that should be involved with evaluation or improvement programmes?
3. What are the subjects to be developed in the training programmes?
4. Where should training programmes be held and in what language?

i. What are the needs of the region in terms of animal genetic resources?

- evaluation and characterization of indigenous breeds: sheep, cattle, goats, camels and horses;
- preservation of superior local breeds;
- improvement through management, breeding and cross-breeding;
- socio-economic aspects of different animal production systems.

ii. Who are the key people in evaluation or improvement programmes?

Professional who are:

a. Responsible for the formulation and conception of programmes:

- animal breeder at the government level;
- animal breeder at the university;
- heads of animal breeding associations when they exist.

b. Responsible for execution of the programmes:

- middle level technicians;

- farm managers.

All these categories have to be trained.

iii. Subjects to be developed in a training programme:

a. Methodology and policies:

This point concerns mainly:

- the establishment and efficiency of breed societies;
- the design and evaluation of selection and cross-breeding programmes in experimental stations and in the field.

b. Science and technology:

- inventory of the main breeds and their performances;
- cryopreservation of semen and embryos;
- disease resistance and new approaches for vaccination and disease prevention.

c. Socio-economic topics:

iv. Location and language:

Three languages have to be considered for African countries:

- Arabic, English and French.

Location of the training programme can be:

- at a national level: each country having its own programme especially designed for middle level technicians and farm managers;
- at a subregional level: programme designed for high level technicans from different countries having the same interest;
- study tours for decision makers.

EDUCATION AND TRAINING FOR ANIMAL GENETIC RESOURCES IN THE TROPICS

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1. INTRODUCTION

Credits on genetic conservation of animal resources are seldom listed or available in most animal science or veterinary courses. Evaluation is an area related to conservation that is taught but usually in basic sciences including genetics. Although many people in animal production are aware of some of the advantages of genetic conservation, only a few attempts have so far been made towards that direction of implementation on the ground. One major reason for this is the sole desire to improve yields quickly through crossbreeding for which tools like artificial insemination are readily available. It is easy to use them and immediate results are fantastic. Another reason is the ignorance that costs to maintain local resources far exceed income. This is based without taking into consideration the value of these animals in the event of any breakdown of the improved breed in the unforeseeable future. Smith (1984), worked out economic values of preserving germplasm in the face of uncertain needs and opportunities, for use in the unknown future and concluded benefits greatly exceeded costs. Even if they are free of these myths, many do not have the time or knowledge or both to set off to conserve their genetic resource of domestic livestock species. In a number of countries, conservation herds are maintained. However initial collection was not representative of the breed with most of the animals derived from a single region due, to inaccessibility to other areas. In other cases, animals could be traced back to only a handful of parents.

Thus the importance of courses has been discussed ' in previous meetings of the FAO/UNEP Expert Consultations (Osman, 1984 and Bodó, 1984). A comprehensive course was also conducted in Hungary sponsored by FAO. The present paper highlights some aspects of the training course and interregional communication between countries.

2. PARTICIPANTS OF TRAINING COURSE

Trainees in genetic resource conservation should include:

a. Professionals. Those who are actually responsible for the job of breed improvement at various levels within a country. This group could also include other professionals indirectly related to animal production such as farm managers.
b. Technicians. These people include those who work closely with animal geneticists or breeders.

3. BRIEF SYLLABUS

The following is a brief list of special topics that need to be emphasized in addition to what has been presented in the two volumes of the manual prepared during the course held in Hungary.

a. Evolution of our domesticated species.
b. Sampling technique. This is perhaps one of the most critical stages of conservation. Whatever samples collected should truly represent all aspects of the population and be a true representative. Sample size, ratio of male to female etc. need to be calculated.
c. Recognition of types or lines. Within several indigenous breeds we could recognize distinct lines. For instance, the Kedah-Kelantan cattle in Malaysia has distinct colour groups, brown, yellow and black, all within the same region. Another example is the swamp buffalo of various sizes and conformation in China, Southeast Asia and Sri Lanka.

d. Characterization and documentation. The FAO/UNEP Expert Consultation on Methodology for Data Banks Finalized characterization lists and methodology in 1985 and a manual is currently being prepared. This will serve as a useful document for future creation of standardized data banks and course material.
e. Utilization of data banks. An approach to the proper utilization of the information in the data banks needs to be introduced using the most appropriate statistical methods. Demonstration on the application of selected microcomputer software appropriate for data banks should also be included.
f. Management of live resources. Should the animals be raised under average management and feeding standards exposing them to usual environmental stresses and diseases or should they be under the best available conditions? Should the excess animals be randomly culled or done selectively. If the latter, the options are single trait or multitrait selection; and if multitrait, which are the traits and are they weighted equally or otherwise.
g. Genetics. The students need an appreciation of maintaining variability and its genetic basis in a population. Cytogenetics and quantitative genetics should be briefly covered.
h. Breed society. The establishment and mode of function of breed societies are useful techniques in gaining interest in the breed among farmers and institutions.
i. Cryogenic storage. Steps in the collection of eggs, embryos and sperm, their storage and retrieval need to be outlined.
j. Blood parameters. Aspects of protein polymorphism, red cell antigen and enzyme variations within and between breeds should be included in. the curriculum only to reinforce their value as measures of genetic distance, evolutionary relationship and to understand control and eradication of diseases.
k. Genecology and production in relation to climate, disease and vector and parasite spectrum.

Details of embryo transfer and blood parameter techniques are specia lized areas, only relevant points need to be studied. Practical exercises should be included wherever possible. The technical details in the above list should be limited in courses arranged for technicians with more emphasis on management techniques for them.

4. COURSE DURATION

The recommended period is two weeks for a generalized course.

5. LOCATION

The exact location in the tropics is not critical. However, existing centres for animal production within the tropics are preferred. Facilities for microcomputer (together with well documented software), cryogenic storage, cytogenetics and immunogenetics are essential. Farm facilities to examine and characterize breeds within various species of livestock are also essential prerequisites to the choice of location.

6. RECOMMENDATION

A two-week training programme is warranted in each of the Asian, South American and African regions. Regional emphasis is necessary because of the differences between these regions and similarities within, in the species utilized and production systems. Regional cooperation will also be more effective. Participating countries should be selected by FAO based on the existence of promising indigenous livestock. The responding country should be encouraged at the top management level so that they will pursue the national conservation programme after the trainee has completed the course. There is sufficient interest in East Asia and Southeast Asian countries on the characterization, and conservation of their buffalo and cattle besides other small ruminants.

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EDUCATION AND TRAINING ON ANIMAL GENETIC RESOURCES IN THE TROPICS

South American Camelids

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In the Andes human and environmental systems are experiencing irreversible deterioration.

Scientists and government officials know the problem exists but there is no consensus about the causative factors. In the past and at present these highland areas were considered marginal and have supplied camelid meat and wool for the people in the lowlands. There are systematic deficiencies of knowledge and the problems are not well understood.

Urban education on rural matters is limited, and knowledge on highland life is scanty.

In rural areas 80 percent of alpacas and 100 percent of llamas are in the hands of small farmer families, having a subsistence economy and cultural values different from the western world.

The camelids are complementary to the limited and risky agriculture which is due to climatic reasons.

Pasture use is based upon traditional knowledge, which though not always correct has permitted conservation of these animal resources since the future of these people depends upon them.

EDUCATION AND TRAINING FOR ANIMAL GENETIC RESOURCES IN THE TROPICS - DEVELOPED COUNTRY VIEW

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The experience of recent decades in Europe and North America is that the development of livestock improvement programmes has not been limited by deficiencies or shortages in professionally trained manpower. In recent years, as aspects of the underlying sciences have become more sophisticated, a number of cooperative graduate training programmes have been established - in particular the Internordic Course in Scandinavia and the collaborative course in Germany. These have give additional benefit of creating international personal networks among research and development staff, which have served their respective countries very well. This idea is worth considering in other parts of the world.

One problem which has occurred in different ways in different countries has been that some of those with major responsibilities for livestock breeding policy and practice have not had an adequate knowledge of modern animal breeding methods. This has applied in some cases to key administrators in Ministries or breeders' organizations. In general, this problem has declined in recent years as governments have reduced their activities and control in livestock breeding practice. It is important that developing countries should be aware of the potential costs of excessive conservatism at the administrative level. Perhaps there is a case for special short courses specifically designed to keep key adminstrative personnel aware of recent technical developments and potential.

A further lesson from the experience of the developed countries is the extent to which the implementation of livestock improvment programmes has depended on appropriately trained technical staff. This applies in the areas of animal management, data management, and in the management of the infrastructure required for a modern breeding scheme. The new teaching medium of videodisc combined with microcomputer provides a new and powerful means of providing much of the training at this level which will be needed in developing countries.

Throughout the developed world, but particularly in Europe, much as been gained by 'lateral' transmission of information and experience, i.e. by each country learning from the experience of its neighbours. There are undoubted advantages in attempting to emulate that pattern elsewhere, e.g. in Africa. FAO's regional networks are perhaps the appropriate framework.

The social and administrative structures in developed countries have in general provided acknowledgement and reward for staff contributing effectively to livestock improvement activities - whether at the research, management or operational level. This has helped to ensure commitment of staff and success of the programmes. In order to strengthen motivation in developing countries, it could be worthwhile instituting some international system of recognition or awards to individuals making significant contributions to development in their own countries.

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