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**THE NATIONAL SHEEP AND GOAT IMPROVEMENT PROGRAM
PROCALFER-MAFA, PORTUGAL**

A Three Year Work Plan (1984 - 1987)

Prepared For
PROCALFER-MAFA, Portugal

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Abbreviations Used in This Document

MAFA	Ministry of Agriculture, Forestry and Food
DGP	General Direction for Livestock
DGA	General Direction for Agriculture
EZN	National Zootechnia Station
NSGIP	National Sheep and Goat Improvement Program
DRTM	Regional Direction for Tras-os-Montes
IUTAD	University Institute for Tras-os-Montes and Duro Minho

**A Three Year Work Plan (1984-1987) for the
National Sheep and Goat Improvement Program,
PROCALFER-MAFA, Portugal.**

INTRODUCTION

The National Sheep and Goat Improvement Program (NSGIP) for Portugal was developed as a part of the PROCALFER Project. Beginning in 1981 the program was developed by the General Direction for Livestock - MAFA with the assistance of the Sheep-National Animal Agriculture Development Consultancy (Sheep-RAAD, formerly Sheep and Goat Consultancy). During this period several major programs have been undertaken by NSGIP. These include: (1) An institution building program involving personnel training and facilities development, (2) a Basic Management and Breed Evaluation Program, and (3) producer support programs. The Basic Management and Breed Evaluation Program serves as a core program and is being carried out at ten locations. It is being conducted by one General Direction for Livestock Station, eight Regional Direction Stations and one private producer flock in five of the seven regions. This represents the major small ruminant production areas of Portugal. There are ten genotypes of sheep (this includes four crossbreds, some exotic breeds), which represents the majority of the twelve breeds of sheep and one of the four breeds of goats.

The Basic Management and Breed Evaluation Program is serving a twofold function: (1) helps to establish these locations as demonstration centers for producer support programs and (2) generates data to measure reproduction and production capabilities of the major breeds in Portugal under the local environments in which they are produced.

Further details and summaries of accomplishments can be obtained from previous consultancy reports and from the PROCALFER Project evaluation team report.

THE THREE YEAR WORK PLAN

A National Program for Sheep and Goat Improvement implies identification, development, integration, and application of essential factors required for measurable increases in sheep and goat production under the varying conditions existing in Portugal. The full achievement of such a program is not possible during the period of the program in Portugal (1981-1987). But there must be an ongoing program with the establishment and development of basic programs and plans for initiation of other desired programs to be achieved in the future. Such a program

includes the development of production and management practices as alternatives to traditional practices for increased production by the producer in the varied conditions in Portugal. These must be based on data generated primarily under standardized local conditions for the different native genotypes of sheep and goats and ultimately include selected importation of germ plasm to strengthen their production capability. These production and management practices must be properly presented through producer support programs, to producers, as viable alternatives for improved production with all levels of resources required for their use. This is necessary so that producers can evaluate their usefulness under their specific conditions and choose those they consider of greatest value. Budgets, based on reliable data which reflect alternative management practices, must be available to allow producers to compare the profitability of production alternatives. At the same time, marketing systems must be functioning to assure an appropriate outlet and price for an increased quantity and quality product as an incentive for increased investment of time and money. Also lines of credit at reasonable cost to the producer must be available so that the producer can initiate the management practices required to increase quantity and quality of production.

The National Sheep and Goat Improvement Program is of little functional value until its cost effective, recommended programs are being used by producers and resulting in better utilization of resources with improved production of animal products which in turn increases the standard of living of the producers and the self sufficiency of their region and the country.

The purpose of this three year work plan is to provide an outline of work to be accomplished from the present through the expected end of the project in 1987 and its relationship to work underway or completed since the initiation of the program from 1981 to date. It is also the intent of this work plan to provide, near the end of the project, a plan of activities for the subsequent five years (1987-1992) and perhaps beyond to further assist in the successful continuation of the program.

III. SCOPE AND INTENT OF THE THREE YEAR PLAN

The consultancy has developed this work plan to include the required inputs to provide the best opportunity for measurable increases in level and efficiency of sheep and goat production. By design, it has included development of programs and the availability to the producer of all resources necessary for increased production. It places the major responsibility for success on Portugal, both from providing the required resources (monetary, physical and personnel), and their use in providing the initiative and follow-through to make them work. The required resources will be several times greater than those provided to date, but

represent a reasonable investment for the expected results. The total program is very ambitious. The Consultancy believes that it can best serve the program by providing this total, overall plan. We recommend that the DGP and PROCALFER carefully evaluate the program plan, in terms of the total program and its separate parts, and determine what will be of greatest value to Portugal based on resources available.

The Consultancy believes the total program is necessary for the most complete achievement of the objective of increasing production and will be an excellent investment for all future development. It believes that if resources are available the program can succeed under the leadership of the DGP. The Consultancy believes that programs to date have been successful due, in part, to its own experience and expertise, but more significantly because of the interest and ability of the DGP, with support from Regional Direction Stations, to take initiative and follow-through on the selected programs.

The Consultancy is dedicated to, and has keen interest in, assisting in the development of all or parts of the program according to the decision of DGP and PROCALFER. We hope that the total program can be carried out. We look forward to continued work with the DGP, the livestock stations, and PROCALFER in this program.

IV. GENERAL STATEMENT OF OBJECTIVES OF THE THREE YEAR WORK PLAN.

The overall objectives are to develop viable alternative management practices, based on data generated in Portugal, to improve sheep and goat production under the existing conditions, to extend these practices to producers resulting in their adoption and to outline a collaborative framework to provide input for other factors limiting production including agricultural policy, marketing systems, and lines of credit. These overall general objectives can be divided into following sub-objectives.

A. To complete the current phases of the Basic Management and Breed Evaluation Program now in progress in terms of data collection, analysis, interpretation, and publication as technical and extension information and apply the results in development of alternative management practices for producers and procedures for genetic improvement of sheep and goats.

B. To expand and extend production related programs at the existing cooperating locations and with cooperating producers to obtain relevant information on (1) nutrition and forage and pasture production and utilization by livestock, primarily sheep and goats; (2) procedures and implementation

of economic analysis of production systems, including alternative management practices; (3) conduct of special production related projects to provide additional relevant information of production to directly assist producers.

C. To encourage and assist in the development of extension programs for assisting producers in improving sheep and goat production and in the development and use of the livestock stations as centers for demonstration.

D. To recommend and assist where possible in the development and encourage implementation of relevant national and regional animal health programs to control disease as a measure to improve production.

E. To encourage and facilitate, where possible, cooperation among institutions/organizations in Portugal with resources that can contribute to the improvement of sheep and goat production.

F. To assist in institutional building through (1) personnel training through formal degree and non-degree programs, by technology transfer, and by program assistance to persons carrying out basic management and breed evaluation programs and (2) to continue to assist in development of physical facilities.

G. To plan and conduct, in cooperation with appropriate national organizations, a National Conference on Sheep and Goats in Portugal.

H. To establish the National Sheep and Goat Improvement Program as an integral part of the existing ongoing programs in the General Direction for Livestock, Regional Directions and other cooperating organizations and/or agencies involved in the Improvement Program.

I. To suggest a framework for interdisciplinary collaboration (production and management, producer support, economic analysis, marketing, credit) in a National Sheep and Goat Improvement Program to more fully achieve improved production by the producer.

J. To develop a five year or longer plan for continued activities (beyond 1987) of the National Sheep and Goat Improvement Program.

V. PROCEDURES AND ESTIMATED TIME SCHEDULES TO ACHIEVE THE OBJECTIVES.

During the first approximately three years of work the National Sheep and Goat Program successfully established itself as a viable entity with the ultimate goal of providing alternative management practices to the producer resulting in increased level and efficiency of sheep and goat production.

Consequently, during the next three years, the program will continue and expand the work already underway and will emphasize two major components throughout the program which are essential to success; (1) personnel training as a part of institutional building and (2) development and conduct of producer support programs which will provide information and resource assistance to the producer and maintain two-way communication between the producer and the National Program.

More adequate identification of the producer as the target of effort is essential to the success of the program. According to information developed by DGP (Dr. Luis Gama, *et al.*, 1982) the flock size of sheep and goat producers in Portugal varies from as few as one or two animals to several hundred. This represents producers with greatly varying resources and abilities to optimally use resources that might be provided for improving production.

Some relevant information is summarized in Table 1. From these data it can be seen that 90% or more of the producers of both sheep and goats have flocks of less than ten animals which represents proportionately less of the total animal numbers than the smaller number of producers with larger flock sizes. For example, if it is assumed that ten animals represents a minimum number in an economic unit, then 18,800 sheep producers or 10.9% have economic units which represents 1,262,515 or 72.4% of the total sheep. For goats the figures would be 9,542 or 6.4% of the producers with economic units representing 432,150 or 53.6%. Assuming the minimum number of animals for an economic unit is twenty, the figures for sheep would be 12,443 or 7.2% of the producers with 1,166,260 or 66.8% of the animals. For goats 5,091 or 3.4% of the producers with 366,185 or 43.3% of the animals.

This indicates that the largest number of animals, and therefore the greatest initial impact on production in Portugal could be effected by providing support to the producers with larger and supposedly economic units. However this would reach a minority of the producers. With this in mind one approach might be to (1) assist producers with larger and supposedly economic units to increase production, i.e., provide alternative management practices and required resources, and (2) assist the producers with smaller and supposedly less than economic units to

increase their number of animals or other enterprise components so they become more economically feasible and then provide the same assistance as other producers under No. (1). It must also be recognized that sheep and goats are often a part of a mixed farming system and therefore represent varying degrees of economic importance in the overall producer enterprise. The goal of the National Sheep and Goat Improvement Program is to provide effective support to all sheep and goat producers in Portugal.

The procedures and expected required time schedules are provided separately for each objective.

PROCEDURES TO ACHIEVE OBJECTIVE A: Basic Management and Breed Evaluation Program.

The phases of this program and estimated completion dates (years) for each location is shown in Table 2.

Data collection following program initiation has proceeded as scheduled. However, the processing and analysis of the data have not been possible because computer equipment has not been provided. This constitutes a critical threat to some aspects of this program. Very large amounts of data have been accumulated and even when a computer becomes available it will be extremely difficult to process the backlog of data on a reasonable time schedule without allowing additional, more current data to also accumulate. The need of the computer was anticipated by the Consultancy and by the DGP. Oral and written formal requests, including justification, time schedule and recommendations on capabilities of computers were submitted for approval and procurement. However, somewhere the system responsible for approval and procurement of the computer equipment failed, resulting in the development of the serious backlog of data.

A computer has recently been selected and ordered and delivery is expected in early 1985. DGP has selected persons to be trained as operators to enter data and training programs are being provided by PROCALFER and OICD/AID.

During discussions in Portugal in October 1984 (Drs. Luis Gama, DGP; Tommye Cooper, OICD computer consultant; Carl Hausler and Warren Foote, Sheep and Goat consultants) a decision was made to divide the data into six subsets (Figure 1) to prioritize and facilitate data entry, programming and analysis. The highest priority data were determined to be the "ewe productivity" and "lamb weight gains" data subsets. Working with these two data sets, selected data entry and analysis will be carried out as the initial data processing activity. This will provide for the establishment of procedures for data entry programming and analysis and at the same time complete analysis of data considered to

be most useful to estimating reproduction and production capabilities and flock management. When these have been completed additional data will be processed according to priority, time, and other available resources.

Recommended procedures for the initial data processing and analysis are as follows.

1. Step 1.

a. Transform (by hand) all ewe productivity data from original data sheets to the suggested format (Figure 2). From this form, the data can be entered directly into the microcomputer. Someone familiar with the data forms and who understands the meaning of the various data will be required to successfully transform the data. Further, decisions will need to be made by this person which will draw upon knowledge and understanding of the Basic Management and Breed Evaluation Program data. Some of the columns on the recommended form (Figure 2) do not have direct counterpart columns on the "Ficha de Registro" form (Figure 3) where the data are currently found. The following rules will apply:

(1) The number lambs born dead column will be a total of lambs born dead plus those aborted.

(2) The number lambs weaned is not found directly on the original data form, but can be easily totaled for each year per ewe.

(3) Total lamb weight born column - if twins or triplets are born, total their weights. If the lamb is a single, its weight is entered.

(4) Total lamb weight weaned: total weight of all lambs weaned per ewe (same procedure as for total weight of lambs born). Both (3) and (5) may need to be calculated before transformation to the recommended form.

b. The computer entry person can then enter the data directly from the "Recommended Form For Transformation of Ewe Productivity Record Data" (Figure 2) into the data base of the microcomputer. This person need not be familiar with the data or the Basic Management and Breed Evaluation Program since the data has been "cleaned-up" for ease of entry.

c. The microcomputer can be programmed to calculate (see Figure 4):

(1) age at weaning

(2) age corrected weaning weights

(3) Lambing percentages

d. The microcomputer can be programmed to average the parameters in (c) above for each breed, each year and each station as deemed appropriate.

e. As computer capabilities increase through further consultant assistance and training opportunities, statistical procedures can be applied to the data base to estimate differences between breeds within stations, etc. This step is to be and should only be performed after all steps below are completed!

2. Step 2.

This second step of data analysis is to begin only after all data from the Ewe Productivity Records are transformed (Step 1 above). This step would be to transform the Lamb Weight Gain records (see Figures 5 & 6). Transformation of these data will be easier, but it should be noted that not all weights will be transformed (i.e., W1, W3, W5, etc.).

It is anticipated that these weights can then be analyzed to graphically depict average lamb growth to weaning for the various station, years and breeds.

Statistical analysis of the complete lamb weight record set will be performed only on a small, randomly selected sample of the lambs. From the sample, estimations on the population can be used to generate correction factors for later use in evaluating ewe productivity. This step will be of secondary importance and should not be attempted until Steps 1 and 2 are complete.

Further data analysis will need to be discussed and planned in conjunction with all persons involved in this aspect of the National Sheep and Goat Improvement Program, during future consultancy visits. The estimated completion dates for these activities are shown in Table 2.

The establishment of procedures and handling of data (recording, computer entry, programming and analysis) is a major concern because of the very large backlog already accumulated and the need for day to day assistance, by the consultancy, to DGP personnel directly involved.

Four possible approaches to accomplish this are suggested in order of preference by the Consultancy. These must be evaluated and a final decision made very soon by the DGP and the Consultancy. These approaches are as follows: (1) A Portuguese speaking person provided by the Consultancy with adequate background in animal science and computer work would be assigned to the DGP in Portugal for an estimated period of 9-12 months. This person

would have a B.S. or M.S. degree; capabilities would be the major consideration. Such a person could begin in early spring, 1985. (2) DGP would send a person with adequate animal science and computer science potential to Utah State University for training. This would require 6-9 months. This would delay effective data processing by the length of the training period and increase the backlog of data. (3) Attempt to conduct data processing by telephone and/or telenet communication between DGP personnel and the consultancy, and consultancy visits to Portugal. (Dr. Rex Hurst, statistics and computer consultant, will be available to serve this function as required for any arrangement to develop computer procedures). Discussions between DGP and Consultancy indicate that this approach would be most workable. (4) To send the data backlog to the consultancy in Utah for entry, programming and analysis. It is recognized that some combination of the above may provide the best solution.

Recommended procedures for development of a data collection and summarization system. This system should establish a central processing facility similar to the Dairy Herd Improvement Association procedures in the United States.

Animal identification sheets would be filled out once and then periodic sheets (i.e., quarterly) would be prepared and sent to the various stations for recording data for that period. These prepared sheets would be: animal numbers down the side and column headings across the top for recording the desired information. Many recording errors can be eliminated by the person doing the recording to match animals with a list of animal numbers and by being able to see like data in columns.

The data would be summarized and the summaries returned along with a batch of barn sheets. This type of a system could be implemented in stages and data already collected added to the system as resources are available. New stations could be added progressively.

Summarization procedures need to be developed that will aid in accomplishing the stated objectives. The different types of animals will require different types of recording forms: breeding ewe productivity (lamb production), milk production, lamb gains, etc.

The various stations should keep a management log (diary) that will include such things as: pasture availability, type of forage, supplemental feeding, breeding dates, weather conditions, and any other information that may help explain the production data. This log should accompany the filled-in barn sheets, and the information coded and added to permanent records. These types of information will be very useful in interpretation of results from a nutrition, disease, climatic and other environmental point of view.

The supplemental management information should aid in evaluating reasons for the productivity variations from station to station. The periodic summarizations should motivate the stations to better record keeping and allow interplay among the stations. Unless records can be processed immediately, the backlog becomes so great that nothing ever gets done with the records and the system fails.

The summarization procedures need to be defined and the barn sheets need to be set up. The channels for data communication have to be set up. The software must be developed for data entry, data summarization, and field sheet generation. To accomplish this an integrated computer system needs to be developed.

The initial system may be put together using outside resources, but provision must be made to train personnel in their various roles. Someone with computer talent must be developed into a systems analyst/programmer to make modifications in the system as needed in the future. Provision needs to be made for continual modification of the system. The system must respond to new demands, user suggestions, changes in objectives, etc.

Recommended training programs to support this aspect of the work are outlined under procedures to achieve Objective F.

PROCEDURES TO ACHIEVE OBJECTIVE B. Nutrition and Forage and Pastures; Economics; Special Programs.

Work in this objective will be conducted in the three following categories: 1. Nutrition and forage and pasture production and utilization; 2. Economic analysis of production systems, and 3. Special production related projects.

1. Nutrition and pasture and forage production and utilization.

Information in this category is very inadequate but essential if actual economic improvements in livestock production are going to be achieved. Persons with interest and specific training and experience will be identified to plan, organize, and conduct these areas of work. It is expected that they will be persons currently involved in the existing General Direction for Livestock and Regional Directions and other organizations such as EZN, National Forage Station (Elvas), and Universities.

A major effort will be made to gather available information, generate critical lacking information and compile a feed handbook for Portugal dealing with nutrient requirements of livestock, primarily sheep and goats, during their different reproduction

and production processes, the nutrient content of the most important forage and pasture plants in Portugal, and outline production and management using this information that can be used by the producer to improve livestock production. The physiological processes for which nutrient requirements will be estimated will include maintenance, growth, reproduction, lactation, and their combination.

During the first year, persons for cooperation will be identified. With the assistance of the consultancy and the Portuguese personnel relevant available data in Portugal as well as other parts of the world will be accumulated and evaluated, and programs outlined to obtain additional essential information. Also, during the first year, resources (i.e., laboratories) for chemical analysis of feed will be identified and arrangements made for their use as appropriate. Significant amounts of information are available on many aspects of forage production and its response to different management practices. Data are also available on livestock production when grazed at different stocking rates on some improved pasture (i.e., subterranean clover). However, the use of these data by the producer is seriously limited because most of the trials have been conducted on single pasture plants or combinations without comparison to more traditional or other alternative pasture, and they have not been field tested under conditions from which inferences for use by producers can be adequately drawn. Also, there appears to be inadequate economic analysis information available. Work dealing directly with these factors will be as specifically addressed as resources and time will allow.

The following additional related projects will also be conducted:

(a) The nutrient value of forages and pastures will be estimated where possible from feeding trials.

(b) The quantity and quality of feed available for self harvesting by sheep and goats from pasture and range lands will be estimated. This will include the seasonal availability and its relation to reproduction and production functions as suggested in Figure 7 (from previous Consultancy report). In this regard the use of by-products, residue and crop aftermath feeds will also be stressed in optimizing livestock production during the annual feed production cycle.

(c) The importance of inventory control of all livestock as a means of managing feeds for increased production will be demonstrated through disposing of unproductive animals and segregating animals according to specific reproduction or production function and body condition. Most of the information required to accomplish this at the station level is already available through Objective A.

(d) Modelling will be used, as appropriate, to investigate selected responses of animals to environmental change and their relationship to feed requirements.

Approved projects will be initiated during the second year. Some of these will be long term (in excess of three years) and some will continue throughout the remainder of the project beyond.

Also during the second year the format of the Feeding Manual for Portugal will be outlined and compilation begun using available information. During the third year the Feeding Manual for Portugal will be completed and published for use particularly by livestock producers and persons working in livestock producer support programs.

Economic Analysis.

The major effort will be to develop computer programs for farm budget building for sheep and goat production for the different production regions of Portugal; build in 'What if' capabilities to evaluate the profitability of alternative production and marketing practices; and outline the data required to develop budgets, and relate to data already being collected. The consultant involved in work dealing with economic analysis will work with the DGP to identify a Portuguese person(s) with whom he will cooperate and assist in achieving this Objective. They will interface with PROCALFER consultants working in Policy and Economic Studies and with Portuguese economists, as identified, to optimize the efficiency of efforts through exchange of information and to limit duplication of effort.

A thorough understanding of current production practices is essential in developing budgets. Costs of production data are needed as are data relative to prices received. Also, it will be necessary to become familiar with the market system as well as the role of supporting organizations and institutions which influence production and marketing decisions. Important also will be an understanding of social customs which may influence production and consumption of sheep and goat meat and cheese. The basic information needed initially is listed below. While the list refers to sheep the same applies also to goats.

a. Production.

This includes: Age of animal when normally bred, gestation period, age of offspring at weaning, percent lamb crop weaned, age and weight of animals at weaning, age and weight of lambs when sold, useful life of ewe, weight of cull ewe, number of ewes serviced per ram, number of lamb crops per

year, length and number of lactations per year, kilograms of milk per ewe per lactation or per year, kilograms of cheese produced per ewe per lactation or per year, kilograms of wool produced per ewe, types and amounts of feeds fed, pasture requirements under various conditions, and disease problems.

b. Costs.

Cost of production data are needed to develop enterprise as well as whole farm budgets. These data will include cost of a ewe, cost of a ram, amount and cost of different feeds, cost or value of labor, interest rate, transportation & other marketing costs, storage costs for products produced, medical and veterinary costs, and value or cost of pasture feed (owned and rented).

c. Returns.

Prices received for livestock and their products are apt to fluctuate seasonally. This price variability, along with other production factors, may give rise to recommended change in the normal breeding season or in marketing practices. As the project develops, seasonal price patterns should be examined. However, initially, only average prices will be used. These include price received for milk, cheese, meat, wool, and hides; sale price of breeding stock, cull ewes and rams; and home consumption of milk, cheese, and meat.

d. Develop Budgets.

A first step in developing farm budgets will be to determine the procedures already available in Portugal and gain access to any relevant farm budgets already developed. Budgets to be developed will include: sheep for milk and meat production, goats for milk and meat production, whole farm operation - mixed farming and livestock production.

The following work will be accomplished the first year.

Introduction to basic farm management principles.

(1) Make on-site visits to research stations and cooperating farmers to gather additional data and legitimize the budgets.

(2) Conduct training sessions in the use of the computer to generate budgets, as well as an understanding of basic farm management principles upon which the budgets are based on:

- Farm management economists within the Ministry of Agriculture. Involve them in training workshops outlined below.
- Extension and research personnel.
- Selected Producer - Cooperators.

(3) Become familiar with the basic market structure. Gather information on existing marketing alternatives, including storage facilities for livestock products. Obtain data on seasonal price movements and refine the production/marketing model as required.

(4) Become familiar with local customs and institutional barriers that may influence production and marketing decisions.

(5) Identify personnel who can provide information or otherwise assist in this project.

(6) Obtain commitment to assure continued flow of data to monitor progress.

(7) Make contact with appropriate personnel to determine training needs in the use of computers in farm budgeting and decision making.

(8) Refine budgets on basis of information gathered and recommendations offered during in-country visits.

The following work will be accomplished during the second and third years.

(1) Generate production budgets from data from subsequent years. Evaluate the effect of alternative breeding seasons on profitability.

(2) Gather data on ownership costs of land, machinery, etc., as necessary to do whole farm budgeting and enterprise analysis to determine most profitable enterprises.

(3) Evaluate progress over time in terms of economic efficiency.

(4) Attempt to determine the minimum size of an economically viable production unit.

(5) Evaluate the availability of agricultural credit and relate to production/marketing decisions and activities.

(6) Where possible and appropriate, make recommendations on specific production/marketing practices.

(7) Develop publications on: 1. Development and use of farm budgets in livestock production in Portugal with emphasis on use by producer support personnel and by producers in determining the profitability of management systems; 2. Compilation of farm budgets according to type of production system (i.e., single livestock species, mixed livestock species, mixed livestock species - farming systems).

(8) Apply economic component to alternative management practices provided by the National Sheep and Goat Improvement Program.

3. Specialized Production Related Projects.

Work at locations to date has been primarily the conduct of the Basic Management and Breed Evaluation Program. As this work is stabilized and nears completion and as other resources become available work will be initiated in production related programs that will further define production parameters and contribute to producer support programs.

These special programs will be initiated at locations with the required resources and personnel interest and will depend largely upon the initiative of persons involved at the locations. The conduct of these programs will be started only when resources are available in addition to that required to carry out the Basic Management and Breed Evaluation Program or other programs already underway. These programs will be targeted for initiation in 1985 and 1986 and completion within this period of the three year work plan or extended beyond as needs and resources dictate. These programs will include, but not be limited to, the following:

a. Finishing lambs on pasture. This program will be devoted to development of management systems to finish lambs for slaughter during and following nursing with minimum use of harvested feed, considering weight per age optimizing heavier weights, genotype, season of year and relating to market value of lambs. Where possible, performance of pasture finished lambs will be compared to confinement finishing. This program was initiated at one station in 1984 and will be expanded in 1985.

b. Carcass Evaluation. Standard procedures for obtaining linear measurements of carcasses and relating to live animals will be adapted from published information and personal experience to describe qualitative and quantitative aspects. These will relate to type of feed/management, genotype,

age/weight, season of year and market value. This program has been started in two locations and will be continued and expanded in 1985.

c. Performance Testing of Males. The primary purpose of performance testing is to measure the genetic potential of selected individual males for rate and efficiency of gain and of the identifiable traits such as wool production and quality. A protocol will be outlined to standardize management procedures as judged best suited to the particular circumstances of Portugal. These will include all aspects of care and feeding such as age at the beginning and length of the performance testing period, location of testing, measurements to be obtained and methods of calculating and reporting. These animals can be used as replacement breeding stock at the locations where they originated, at other locations, or by private producers. This program is planned to be initiated in FY 1985-86.

d. Purebreed Registers. A primary purpose of this program is to identify and maintain genetically distinct types of sheep and goats, to preserve native genotypes of sheep and to provide a basis for genetic improvement within a breed and also for crossbreeding. A protocol will be established for purebreed registries in cooperation with livestock improvement programs in DGP that will provide for genetic improvement and be acceptable to the producers. They will include identification (description) of the genotype/breeds involved in terms of phenotypic characteristics and criteria for registration, types and levels of performance, and provision for recording each animal with owner and pedigree.

e. Annual occurrence of estrus and ovulation. This program will provide information on capability of breeds to breed at different periods of the year with occurrence and rate of ovulation. This program will be conducted according to the project outline developed with the assistance of the Sheep and Goat Consultancy in 1982 and detailed in terms of genotypes, location, and observation schedule during the consultancy visit in October, 1984. The work will be conducted at Venda Nova and Aboboda and is already underway.

f. Postpartum events. A primary limiting factor in lambing interval is the length of the postpartum interval or period from parturition to the demonstration of first estrus and ovulation. A management program to increase the level and efficiency of production under selected conditions planned for future evaluation is shortening of the lambing interval (i.e., reduce to less than 12 mo). The information to be obtained from the planned postpartum and the occurrence of estrus and ovulation studies are prerequisite to shortening the lambing interval. The postpartum study will

involve determinations of time of first estrus and ovulation, and an estimate of uterine involution following parturition. Protocol will be established patterned after publications and the experience of consultants and DGP personnel. This project is planned for FY 1986 and should be completed in two years.

g. Estimates of genetic parameters. Rate of genetic improvement, genetic selection programs, and the use of crossbreeding will be enhanced by information obtained from estimates of genetic parameters such as genetic correlations and heritabilities. Protocol will be developed to estimate those parameters based on options and procedures outlined in publications and modified according to local conditions. Because of management requirements and detailed information on pedigrees this work will be carried out at carefully selected locations. The program is planned for initiation in FY 1986 and will be a long term study because responses must be measured in both parents and offspring. This study will extend beyond the three year period of this work plan.

h. Development of locations as demonstration centers. A major function of the locations (General Direction for Livestock and Regional Direction Stations and private producers) in the National Sheep and Goat Improvement Program is to demonstrate improved/alternative management practices to increase sheep and goat production. This includes the development of improved facilities for managing and handling animals and the initiation and conduct of relevant management practices including record keeping.

The establishment of the Basic Management and Breed Evaluation Program assisted in developing the locations, where they are involved, into centers to demonstrate improved management practices. Most of the locations have completed, or will complete in 1985, the animal handling facilities (or work areas) which are essential for demonstration. Some results from analysis of data collected at these locations should be available by the end of 1985 and some information from other programs (Nutrition, forages and pastures, and economic analysis) by the end of 1986. This information will be used to develop alternative management programs which can be applied at the location as part of the demonstration center functions. Some of these practices will already have been in use by this time. Procedures will be developed for activities at the demonstration centers. These include scheduled field days and individual access by the producer to the demonstration center for observation and for assistance in evaluating and updating his production-management system. Field days and related activities have already been initiated at one location and more are planned during 1985.

PROCEDURES TO ACHIEVE OBJECTIVE C. Extension Programs.

The accomplishment of this objective is essential if required resources are to be provided to the producer to assist him in increasing sheep and goat production. Work on this objective should logically be done by Rural Extension. The Consultancy recommends that it assist by providing extension program outlines to Rural Extension for this purpose and by providing other support as appropriate.

Development of Extension Materials.

Some extension related support programs already initiated by DGP & DGA will be continued. These include the development of extension materials such as bulletins, videotapes and slide presentations. Additional activities such as field days and demonstration programs will also be continued and increased as a function of the location cooperating in the Basic Management and Breed Evaluation Program.

PROCEDURES TO ACHIEVE OBJECTIVE D. Health.

Maximum sheep production is dependent upon disease control, therefore placing health in a high priority position. If disease control is to be effective information on the following factors must be obtained: (1) identification of current diseases; (2) diseases that potentially exist (might be introduced); and (3) procedures to increase effectiveness of disease control.

The work to achieve this objective will be accomplished under two major programs: (1) Review and recommend procedures to strengthen National Animal Disease regulatory programs, and (2) Develop and publish procedures (practices) to assist producers in prevention and control of disease.

1. Review and Recommend Procedures To Strengthen National Animal Disease Regulatory Programs.

An informal committee will be organized under the direction of the Director General, DGP to carry out a continuing evaluation of procedures and facilities to monitor, prevent and control animal diseases. The committee will exchange information with other National Programs (i.e., United States and selected European countries) to assure access to best procedures. The committee will prepare and submit a report annually. (This will be initiated in 1985.)

2. Develop and Publish Procedures (Practices) To Assist Producers In Prevention and Control of Disease.

In cooperation with the above program, and utilizing additional selected DGP and Regional Direction personnel, the major diseases involving sheep and goats and information on the incidence of these diseases, and information on methods of prevention and control, will be obtained from all appropriate sources in Portugal. In addition, surveys of producers will be conducted to provide any additional related information. This information will be obtained by early 1986. During 1986 and early 1987 this information will be compiled and together with information available from the above Management and Breed Evaluation Program on animal disease related management practices an, "Animal Health Manual for Sheep and Goats" will be prepared and published. This will be used for training programs with practicing veterinarians, producer support program personnel, and producers in developing animal health programs to increase sheep and goat production.

PROCEDURES TO ACHIEVE OBJECTIVE E. Cooperation Among Institutions/Organizations.

The achievement of this objective constitutes an ongoing effort. The degree of accomplishment depends on the willingness of organizations/institutions to share their resources, directly or indirectly. It will be approached in the following way.

Major resources for production related work with small ruminants exists in the DGP, Regional Directions, EZN, Rural Extension, Universities, Superior Schools and other institutions and organizations. Direct structured cooperation is often difficult because of organizational or political barriers. The experience of the Sheep and Goat Consultancy has been that persons within these institutions/organizations are often interested and willing to cooperate and suggest that effective cooperation in the conduct of research, development of programs, and promotion of sheep and goat production can be accomplished in several different ways. These include the following:

- a. Direct formal cooperation where two or more institutions/organizations are working on a single project or series of projects.
- b. Where less formal (informal) arrangements are made for two or more institutions to work on different aspects of the same general problem to be solved.
- c. Work by institutions/organizations that generally contribute to development and production of sheep and goats without any structured arrangements. These lines of cooperation are currently being discussed with the different institutions/organizations and will continue in reports

through scientific meetings such as the National Conference of Sheep and Goats in Portugal and in discussions and meetings among interested persons. Programs will be suggested and encouraged by the consultancy and DGP as appropriate throughout the remainder of the program. The overall effort will be to maximize attention and effort on improving sheep and goat production.

PROCEDURES TO ACHIEVE OBJECTIVE F. Institutional Building; Training and Facilities Development.

Permanence and productivity of NSGIP depends finally on the strength and relevance of the programs it has developed and on the capability and willingness of the institutions/organizations involved, particularly the ability of their personnel to perform. Effective institutional building involves (1) training of personnel and helping them to become established in viable ongoing programs and (2) providing them with the physical resources or facilities required to carry out their work.

1. Personnel Training Will Be Accomplished In The Following Programs.

a. Advanced (graduate) degree training primarily for the M.S. degree, but also for a highly selected small number of persons for the Ph.D. degree. The requirements for these degrees could be met by obtaining all of the training at a U.S. institution, at a Portugal institution or by conducting the research phase of the degree requirement in Portugal under the direction of the consultancy or of the approved persons representing the U.S. institutions involved, and completing the course work and other requirements at a U.S. institution where the degree would be granted. Conduct of research in Portugal is recommended where possible because it helps the person being trained to become established in relevant research in his own country which maximizes its application and can serve as the basis for continued research after the degree is finished.

b. Long term (6-12 months) non-degree training programs in selected areas of specializations. The completion would be certified by a certificate of completion. The training could be obtained in the U.S. or in Portugal depending on adequacy and conveniency. If obtained in Portugal the consultants could work with Portuguese personnel in planning and conducting portions of the training as appropriate.

c. Short-term training in the U.S. or in Portugal with the same arrangements as for long-term non-degree training. These programs could consist of highly structured short courses to be completed in a continuous period of time. If

conducted in Portugal, they could also consist of short course training provided in segments arranged to relate to research or other programs being developed or conducted by the person being trained.

d. Special technology transfer programs in terms of seminars conducted in one or a few days or longer term (several week) programs. In each case the material transferred would have specific relevance to the needs of the participants.

e. Technology transfer of specific information required for conduct of NSGIP work. This type of training has been effectively carried out as "on the job" training for persons involved in the NSGIP (DGP and Regional Directions) as a part of the program to date.

PROCALFER has indicated that it plans to emphasize training. The Consultancy fully concurs and encourages this emphasis. In an effort to accomplish this, the consultancy suggests that PROCALFER develop information about its training programs including types of programs, requirements, and application procedures and advertise this information throughout Portugal to attract the best possible candidates.

Through the ongoing contacts and programs of the NSGIP the consultancy has identified the following persons and recommends they be considered for training beginning in 1985. These recommendations include specific input from some individuals and agencies. These recommendations are made according to the training categories listed above.

1. a. Advanced (graduate) degree training.

The Consultancy recommends the following areas of degree training and the minimum total numbers of persons that should receive training for each area.

Statistics and Data Collection	3
Animal Health Including Diagnostics	3
Economic Analysis	2
Reproduction	3
Breeding and Genetics	3
Nutrition, Forages and Pastures	3
Production and Management	3
Producer Support Programs	4

Persons currently recommended for graduate degree programs.

Date of Initiation	Name	Organization/Institution	Suggested Subject Matter Area	Type of Training
Sept. 1985	Dr. Luis Gama	General Direction Livestock	Genetics and Animal Breeding	M.S. degree (Portugal/USA)
Sept. 1985	Dr. Henrique Sales Henrique	Regional Direction Ribotejo	Animal Health	M.S. degree (Portugal/USA)
Sept. 1985	Dr. Luis Potes	General Direction Livestock National Reproduction & A.I. Station	Reproduction	M.S. degree (Portugal/USA)
Sept. 1985	Dr. Pedro Simoes	General Direction, Livestock National Reproduction & A.I. Station	Reproduction	M.S. degree (Portugal/USA)
Sept. 1985	Eng. Mafalda Montiero	General Direction, Livestock	Pastures	M.S. degree (Portugal/USA)
Sept. 1985/86	Prof. Jose Avo	University of Evora	Production	Ph.D. degree (Portugal/USA)
Sept. 1985/86	Dr. Jose Luis Tirapicos Nunes	University of Evora	Reproduction	M.S. degree (Portugal/USA)
Sept. 1985/86	Eng. Ana Teresa Castro Pereira	EZN (Fonte Boa)	Nutrition and Management (young goats)	M.S. degree (Portugal/USA)
Sept. 1985/86	Prof. Luis Antonio Domingues dos Santos Fernandes	University of Evora	Economic Analysis	M.S. degree (Portugal/USA)
Sept. 1985/86	Dr. Fernando Jose dos Santos Delgado	Superior Agricultural School, Coimbra	Animal Breeding/ Production	M.S. degree (Portugal/USA)
Sept. 1986	Eng. Claudino Mato	Regional Direction Alentejo, Aboboda Station	Genetics and Animal Breeding	M.S. degree (Portugal/USA)
Sept. 1986	Dr. Carlos Bettencourt	Regional Direction Alentejo, Aboboda Station	Reproduction	M.S. degree (Portugal/USA)

b. Long-term, non-degree training.

<u>Name</u>	<u>Organization/Institution</u>	<u>Suggested discipline</u>
Dr. Jose Potes	IUTAD (Vila Real)	Genetic and Reproduction Techniques

c. Short-term training (in U.S.).

Recommended short course and/or on-the-job training programs and participants.

NAME	Areas of Training									
	Production & Management	Reproduction	Genetics	Nutrition	Pastures	Animal Health	Extension Techniques	Economics	Computer Science	Meat Production
Mario Costa	X							X		
Eugenia Costa							X		X	
Maria Antonio Martins da Cruz	X						X			
Manuela Oliviera								X		
Antonio Manuel do Sacramento Lopes	X	X								
Cabrel de Almeida		X		X						
Maria Isabel Xavier		X								
Ovidio Rodrigues										X
Graca Dias		X	X							
Selene Veige						X			X	
Lurdes Bettencourt							X		X	
Texiera de Sa		X					X			X
Marcelino Tavares			X							
Lopes Castro			X	X						
Renauto Carolino		X		X						
Jose Resende								X	X	
Rui Conduto			X	X						
Reonel Careigos			X				X			
Isaias Picarra					X					
Edgar Correia			X	X						X

*Spring
Summer
1986 or
later*

If as expected that all or nearly all will be taught at same time (in cells)

The areas of short course and/or on-the-job training programs and the participants have been recommended by General Direction for Livestock and Regional Directions.

The requested total training programs for most participants varies from one to six months and involves more formal short course training and on-the-job training or both. The Consultancy recommends that each program be one to two months duration and organized so that all participants taking one subject would be taught at the same time. Special provisions could be provided to accommodate special training needs. It is recommended that consideration be given to including other interested and qualified persons. Late spring and summer is usually the best time to conduct these types of training programs because instructors and university facilities are usually more available and also the weather in many parts of the U.S. is better during this period. It is further recommended that the Consultancy assist in organizing and, if appropriate, in teaching parts of training programs which would likely be held at different locations in the U.S. Spring and summer of 1986 would appear to be the best time, to allow for proper planning and arrangements and to include the optimum number of participants.

d. Specific technology transfer programs.

Training can also be accomplished through technology transfer. It is recommended that a longer term technology transfer program be conducted dealing with experimental design, and planning, initiating and conducting research projects with livestock and pastures.

This would consist of a six to twelve week program to be conducted by Sheep and Goat Consultants during an approximate twelve month period. It is recommended the first approximately two week phase be taught at EZN, Fonte Boa, and that subsequent phases be taught to individual or smaller groups as indicated at their separate locations (institutions) where their related work would be carried out. This technology transfer program would be initiated in 1985. The following persons are recommended for this technology transfer training program. PROCALFER support would be required for necessary travel and per diem costs.

<u>Person</u>	<u>Location</u>
Eng. Ana Teresa Castro Pereira	EZN (Fonte Boa)
Eng. Mario Jose Teodora	EZN (Fonte Boa)
Eng. Ana Leite Salvador	EZN (Fonte Boa)
Dr. Jose Ribeiro	EZN (Fonte Boa)
Eng. Jose Santos Silva	EZN (Fonte Boa)
Eng. Manuel Roberto	EZN (Fonte Boa)
Eng. Paulo Duque Fonseca	Superior School, Santarem
Dr. Antonio Luis Gomes	Superior School, Santarem
Eng. Carlos Andrade	Superior School, Costelo Branco
Eng. Mafalda Monteiro	DGP

In addition to above short-term projects, i.e., seminars will continue according to the pattern established in the past.

e. Technology transfer of specific information.

These programs will continue as formal presentations and on-the-job components designed specifically for NSGIP participants (those involved in Basic Management and Breed Evaluation Program) to extend their expertise and assist in achieving its objectives.

Selected technology transfer programs will continue during consultancy visits.

Specific training programs will be developed and taught on use of computers in all aspects of NSGIP work. These training programs should be developed and procedures set up to cycle station personnel through them as needed. The best situation might be to centralize this function through a university where training programs in an animal science or related department are already in place. Such a training program could be initiated by placing a small group of microcomputers (3-5) in an animal science department. The department would be expected to devote staff time to learn usage of machines. The department would be expected to incorporate the usage of microcomputers in farm record keeping and farm management.

The department would be expected to provide training programs for government worker, researchers, etc., associated with animal science. Personnel costs should be supported, at least partly, by PROCALFER. These programs would be scheduled so as not to conflict with academic use.

Consulting services would consist of the following: (a) Identification of people and location, (b) Equipment and software specification, (c) Training of animal science staff and (d) Continued support of program development and conduct.

2. Facilities Development.

This aspect of institutional building will be accomplished through the continued development of facilities including equipment, as they are identified and resources are available for the continuance of the program, as they are identified in the DGP Regional Directions and other institutions/organizations involved.

PROCEDURES TO ACHIEVE OBJECTIVE G. National Conference on Sheep and Goats.

The objectives, participation, cooperation, and other aspects of this conference were first outlined in the Sheep and Goat Consultancy report dated December 16, 1983. Additional inputs have been made by both Portuguese personnel and the consultancy. These will be incorporated in a detailed conference plan and time schedule. This will be submitted to the DGP and PROCALFER by the consultancy in September 1985. The conference is tentatively planned for late 1986.

PROCEDURES TO ACHIEVE OBJECTIVE H. Institutionalization of NSGIP.

Discussions will continue in 1985 with DGP and the Regional Directions, as appropriate, to identify methods of establishing the National Sheep and Goat Improvement Program as permanent, ongoing programs in the General Direction for Livestock, the Regional Directions, and other institutions/organizations. As other disciplines (i.e., marketing, credit) become involved in the National Sheep and Goat Improvement Program efforts will also be made to institutionalize them as permanent programs in the organization/institution in which they exist. The achievement of this objective is essential to the continuance of the program in Portugal after the termination of the PROCALFER supported programs including the Sheep and Goat Consultancy.

PROCEDURES TO ACHIEVE OBJECTIVE I. Framework for Interdisciplinary Collaboration.

This objective will be achieved by development of a structure among the organizations/institutions involved to provide the input to NSGIP required to develop and implement producer support programs necessary for increased production. It is not possible to achieve development and function of the required collaboration in the three year period involved. The expected achievement will be the development of a collaborative structure or procedure, its acceptance by the DGP and presentation to other agencies/organizations involved. The draft outline of the collaborative structure will be submitted by the consultancy to DGP and PROCALFER by December, 1985. A preliminary diagrammatic illustration of this framework is provided in Figure 8.

PROCEDURES TO ACHIEVE OBJECTIVE J. Five Year Plan Beyond 1987.

General program plans and needs will be developed for at least a five year period beyond the scheduled end of project (1987). The formulation of this projected plan will begin in 1986. This will be accomplished jointly between the DGP, Regional Direction, the Sheep and Goat Consultancy and others as appropriate and finalized in 1987.

VI. SUMMARY OF ESTIMATED TIME SCHEDULE FOR COMPLETION OF WORK BY OBJECTIVE (MORE DETAIL IS PROVIDED FOR EACH OBJECTIVE UNDER PROCEDURES SECTIONS).

Objective	Present - Dec., 1985	January - Dec., 1986	January - Sept., 1987
A. Basic Management & Breed Evaluation	[-----]		
B. Forage & Pasture, Economics, Special Programs	[-----]		
C. Extension Programs	[-----]		
D. Health	[-----]		
E. Cooperation Among Institutions/Organizations	[-----]		
F. Institutional Building; Training & Facilities Development	[-----]		
G. National Conference on Sheep and Goats	[-----]		
H. Institutionalization of NSGIP	[-----]		
I. Framework for Interdisciplinary Collaboration	[-----]		
J. Five Year Plan Beyond 1987		[-----]	

VII. SHEEP - INTERAAD CONSULTANTS, THEIR AREA OF CONSULTANCY AND ESTIMATED CONSULTING TIME REQUIREMENTS FOR PROGRAM ACCOMPLISHMENT. It is estimated that overall, approximately 80% of the time will be in Portugal and 30% in the U.S. This will vary among consultants. Consulting time for the second and third years will need to be adjusted as more specific plans for those years are made.

Name	Expertise	Consulting time (days)		
		Present to Dec. 31, 1985	Jan.- Dec. 1986	Jan.- Sept., 1987
Warren C. Foote	Leader, Prod. & Mgt., Genetics, Institutional Bldg.	60	60	60
Larry K. Bond	Economic Analysis	60	45	45
John E. Butcher	Nutrition, Pasture & Forage, Prod. & Mgt.	60	45	45
Jay W. Call	Animal Health & Management	30	20	20
Jack R. Pitcher <i>Not available substitute</i>	Animal Health, Regulatory (National)	20	20	20
Carl L. Hausler	Reprod. & Prod.	35	35	35
Rex L. Hurst	Statistics, Computer Science	60	60	45
Doyle J. Matthews	Producer Support, Prod.	25	25	25
TOTAL		350	310	295

VIII. FACTORS BEYOND THE CONTROL OF THE PROJECT WHICH COULD LIMIT ITS ACHIEVEMENT.

There are several factors beyond the control of the consultancy or Portuguese personnel conducting the program, which could limit or make impossible its achievement. These include the following:

1. Changes in government policy which reduce or terminate the availability of required resources.
2. Inadequate resources required to establish and conduct the program.
3. Unwillingness of government agencies to cooperate in conduct of the program.
4. Lack of interest or ability of producers to improve their management practices.

IX. APPROVAL OF WORK PLAN AND INITIATION OF WORK.

The work outlined in this three year work plan is a projection, for the most part, of work required to achieve objectives established earlier in the program and continuation of projects already underway or that are being planned. The work plan is ambitious. It has been submitted in what the consultancy considers a complete program requirement form for evaluation by DGP and PROCALFER. The consultancy is prepared to continue its work with the NSGIP as the complete package or with those parts considered most essential or achievable due to resources limitations. We hope that the complete program can be approved. We are suggesting the date of April 1, 1985 for program approval. If this is achieved then the dates noted in the work plan for submission of work for 1985 can be achieved. If approval is later, the dates may need to be revised.

Table 1. Estimates of number of producers and animals for different flock sizes in Portugal¹.

Size of flocks	Sheep				Goats			
	No. of Producers	% of total producers	No. of animals	% of total animals	No. of producers	% of total producers	No. of animals	% of total animals
1 - 4	131,489	76.2	329,000	18.9	126,896	85.5	317,240	37.5
5 - 9	22,173	12.8	155,211	8.9	11,387	7.7	85,402	10.1
10 - 19	6,417	3.7	96,255	5.5	4,451	3.0	66,765	7.9
20 - 49	4,926	2.8	172,410	9.9	3,206	2.2	112,210	13.3
50 - 99	3,164	1.8	237,300	13.6	1,469	1.0	110,175	13.0
100 - 199	2,281	1.3	342,150	19.5	548	0.4	82,200	9.7
200	2,072	1.2	414,400	23.7	358	0.3	71,600	8.5
	172,522		1,745,000		148,315		845,000	

¹The flock sizes and numbers of producers was taken from information compiled by Dr. Luis Gama, *et al.*, 1982; the estimates of numbers of animals were based on their estimates of producer numbers for the different flock sizes.

Table 2. Estimated time schedule for completion of data collection, analysis of data, and publication of technical and extension information from the Basic Management and Breed Evaluation projects at the various locations.

Location	Year 1 (Oct. 84- Sept. 85)	Year 2 (Oct. 85- Sept. 86)	Year 3 (Oct. 86- Sept. 87)
Aboboda		1	2,3
Alcacer do Sal	1	2,3	
Alter do Chao	1	2	3
Castelo Branco		1	2,3
Macedo de Cavalheiros		1	2,3
Mirandela		1	2,3
Paul de Serra		1	2,3
Tondela		1	2,3
Venda Nova			1,2
Vale Formosa		1	2,3

Estimated date for completion of phase:

1. Data collection
2. Data analysis
3. Primary publication of technical and extension information.

These estimates include all phases of basic management and breed evaluation work undertaken at the station.

Figure 1. Suggested Data Base Entry Items For Breed Evaluation and Management Study, National Sheep and Goat Program.

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1. EWE PRODUCTIVITY RECORD

Station
Year and month
Species
Genotype of dam
Dam ID number
Date of parturition (day, month, year)
Ewe weight at parturition
Number of offspring born
Lamb data:
 viability
 weight at birth
 date of weaning
 weight at weaning
Lamb data:
 viability
 weight at birth
 date of weaning
 weight at weaning
Lamb data:
 viability
 weight at birth
 date of weaning
 weight at weaning
Wool data:
 Grease fleece weight
 Staple length
 Classification score
Ewe disposition date
Reason code

2. EWE BREEDING RECORD

Station
Species
Genotype
Ewe ID number
Primary breeding season (day, month, year)
 Six columns for data entry (0=not bred; 1=bred)
Secondary breeding season (day, month, year)
 Six columns for data entry (0=not bred; 1=bred)

(Figure 1 continued)

3. EWE BODY WEIGHTS

Station
Genotype
Species
Ewe ID number
Year
Day, Month, Weight (repeat 13 times)

4. EWE MILK PRODUCTION

Station
Genotype
Species
Ewe ID number
Year
Day, Month of test, Quantity of milk (repeat 8 times)

5. LAMB WEIGHT GAIN RECORDS

Station
Genotype
Species
Year
Lamb ID number
Dam ID number
(birth date and weight at birth - get from ewe record)
Number of lambs born*
Sex
Weaning weight
Weaning date
Day, Month (pre-weaning), weight (repeat 8 times)
Day, Month (post-weaning weighing), weight (repeat 8 times)
Disposition date
Reason code

* in ewe record, but easier to include here.

6. RAM RECORDS

Since there are few rams at each station, it is suggested that for the present these records be analyzed separately.

Figure 2. Recommended form for transformation of ewe productivity record data.

Station	Species	Year	Ewe No.	Age at breeding	Date of lambing	Ewe wt. at lambing	No. lambs born live	No. lambs born dead	No. lambs weaned	Total lamb wt. born	Date weaned	Total lamb wt. weaned	Grease fleece wt.	Staple	Wool classification score code
---------	---------	------	---------	-----------------	-----------------	--------------------	---------------------	---------------------	------------------	---------------------	-------------	-----------------------	-------------------	--------	--------------------------------

Figure 3.

FICHA DE REGISTO DA FÊMEA N° _____

Estação _____

Responsável _____

Espécie _____

Genótipo: P _____

II _____

ANO									
Idade à cobertura (meses)									
Época de cobertura									
Início									
fim									
Data do parto									
Peso ao parto (kg)									
Nº Borregos nascidos									
DESCRIBÇÃO	Nº identificação								
	Sexo (a)								
	Viabilidade (b)								
	Peso à nascença (kg)								
	Data do desmame								
	Peso ao desmame								

PRODUÇÃO DE Lã:

Data da tosquia _____

Peso do velo em sujo (kg) _____

Comprimento da fibra (cm) _____

Classificação _____

PESAGENS (em Kg., com 4 semanas de intervalo)

DATA	PESO	DATA	PESO	DATA	PESO	DATA	PESO

Destino _____ Data _____ Motivo _____

OBSERVAÇÕES NO VERSO (com a respectiva data)

- a) macho =1; fêmea =2;
 b) vivo =1; morto =2; abortado =3.

- e 4. Analysis of Data Breed Evaluation and Management Study, National Sheep and Goat Improvement Program, October 16, 1984.

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It is anticipated that a minimum of the following production measures will be generated from the data entries from each of the participating stations.

EWE PRODUCTIVITY RECORD

Analyze by station and breed:

- a. Age at weaning (date of weaning - date of birth)

- b. Age-corrected weaning weight

$$= \frac{\text{weaning weight} - \text{birth weight}}{\text{age at weaning}} \times 25$$

$$= \frac{\text{weaning weight} - \text{birth weight}}{\text{age at weaning}} \times 105$$

- c. Fertility rate = $\frac{\text{number of ewes lambing}}{\text{number of ewes exposed}} \times 100$

- d. Lambing percentage = $\frac{\text{lambs born}}{\text{ewes lambing}} \times 100$

or

$$= \frac{\text{lambs born}}{\text{ewes exposed}} \times 100$$

- e. Average grease wool yield

- f. Average staple length

- g. Average classification score of wool

- h. Ewe index (to be formulated after initial data collection is complete).

(Figure 4 continued)

2. EWE BREEDING INDEX

a. % ewes marked 1st week = $\frac{\text{ewes marked 1st wk}}{\text{ewes exposed}} \times 100$

b. % ewes marked 2nd week = $\frac{\text{ewes marked thru 2nd wk}}{\text{ewes exposed}}$

c. % ewes marked 3rd week = $\frac{\text{ewes marked thru 3rd wk}}{\text{ewes exposed}}$

d. - f. etc. for 4th - 6th week

g. also calculate $\frac{\text{ewes lambing}}{\text{ewes marked}}$

3. EWE BODY WEIGHTS

Average body weights at four week intervals throughout the year will be calculated.

4. EWE MILK PRODUCTION

Average milk production at four week intervals during the entire milk collection interval will be calculate.

5. LAMB WEIGHT GAIN RECORDS

Calculate average weight gain for two week intervals from birth through weaning.

Calculate averaged weight gain at two week intervals from weaning through one year of age.

Figure 5. Recommended form for transformation of lamb weight gain record data.

Station	Species	Year	Date of birth	Weight at birth	Sex	Type of birth	Date of first weighing	W_1	W_3	W_5	W_7	W_9
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Figure 6.

FICHA DE REGISTO DA DESCENDÊNCIA: ANIMAL Nº _____

Estação _____ Responsável _____
 Espécie _____ Ano _____
 Produção Principal _____
 Filiação P _____ Genotipo _____
 M _____ Genotipo _____
 Data de nascimento _____ Peso (Kg) _____
 Sexo (macho=1; fêmea=2) _____
 Tipo de nascimento (1,2,3) _____
 Data do desmame _____ Peso (Kg) _____

Pesagens (Kg) a):

DATA	PESO	DATA	PESO	DATA	PESO

Data de abate _____ Peso vivo _____
 Peso da Carcaça (quente) _____ P. Carcaça (fria) _____
 Classificação da carcaça _____
 Destino _____; Data _____; Motivo _____

OBSERVAÇÕES (com a respectiva data).

-
- a) As pesagens serão efectuadas com intervalos de 2 semanas até o animal ser retirado do rebanho. Os animais guardados para substituição serão pesados com intervalos de 4 semanas após a saída para abate dos da mesma geração.

Figure 7. Outline of Annual Reproduction and Lamb or Kid Production Schedules.

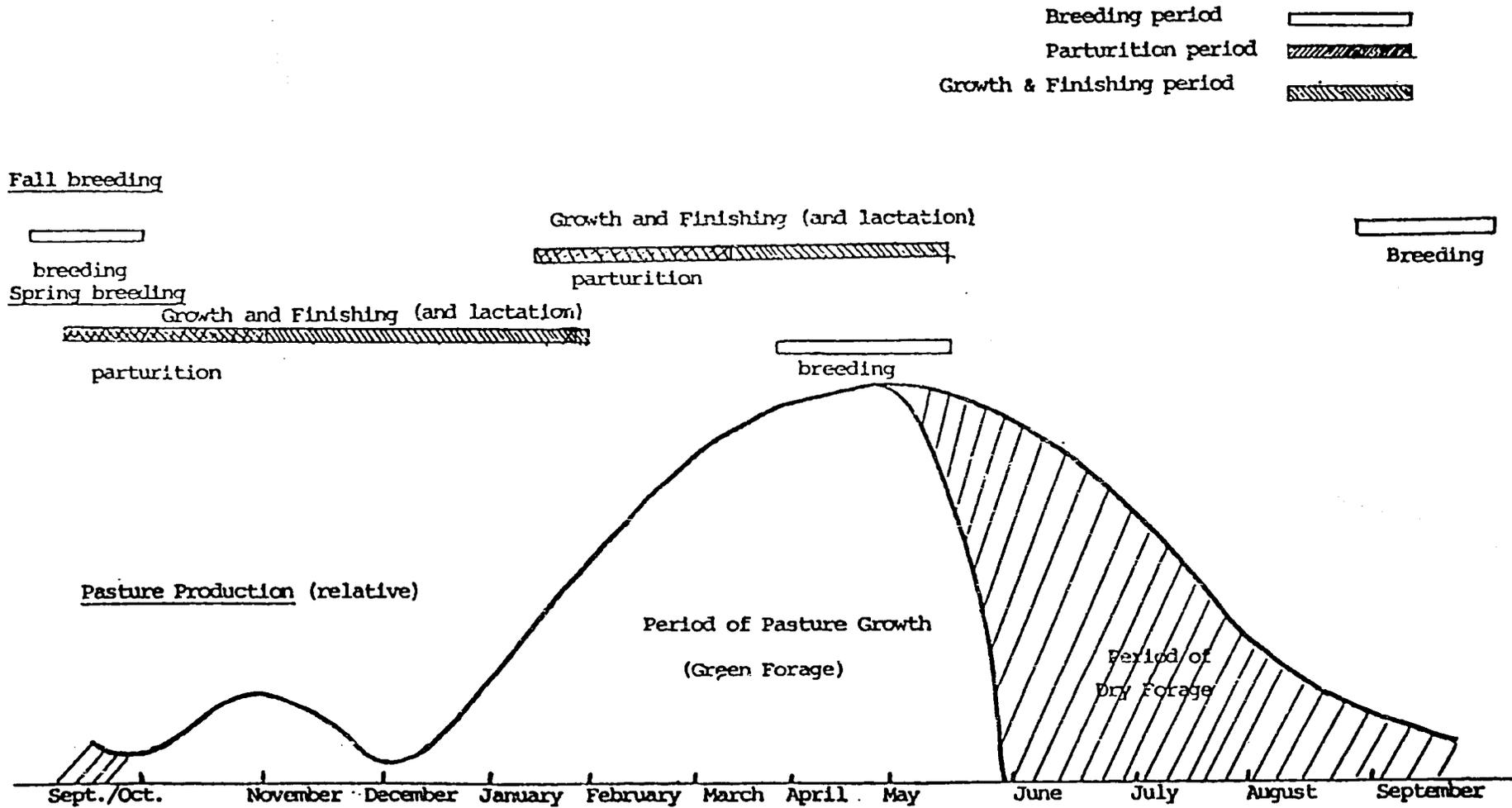


Figure 8. Diagrammatic illustration of the required components of the National Sheep and Goat Improvement Program and their interrelationships in program development and producer assistance.

