

# ANIMAL FEEDING AND NUTRITION

Animal feed is food given to domestic animals in the course of animal husbandry. The present book "**Animal Feeding and Nutrition**" presents the required information on all aspects of nutrition for domestic animals from fundamentals of nutrition through feeds and feeding. It provide extensive coverage of Animal Feed: Type, Nutrition, Safety, Measurement of Feed and Nutrient Utilization, Nutrient Metabolism, Factor Affecting Feed, Feeding Standards and Productivity, Feed stuffs, Feed Preparation and Processing etc. It also covers the Economics of Feeding Dairy Farms, Issues: Environment, Economic and Health Concerns.

The Book is highly useful to postgraduate students of Animal Sciences, Teachers and Scientists of Animal Nutrition discipline, personnel of feed industry involved in feed manufacturing, Field Veterinarians, Animal Husbandry, Extension Workers and Progressive Animal Farmers and Animal lovers.

Dr. Negasi Okoro is a Professor in Animal Sciences at College of Agriculture and Veterinary Medicine, Jimma University, Ethiopia. He has taught Introductory Animal Feeding and Nutrition courses that cover all the livestock species for many years. Dr. Okoro published several research papers and authored/edited few books.



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# *Animal Feeding and Nutrition*

Dr. Negasi Okoro



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## The Author

**Dr. Negasi Okoro** is a Professor in Animal Sciences at College of Agriculture and Veterinary Medicine, Jimma University, Ethiopia. He has taught Introductory Animal Feeding and Nutrition courses that cover all the livestock species for many years. Dr. Okoro published several research papers and authored/edited few books.

The ration formulation software has the same functionality as that used in the industry today and covers each species discussed in the text. Along with the software, the text includes the most current information on animal feeding and nutrition available, including full species coverage such as four ruminants, swine, chickens, rabbits, horses, dogs, cats, trout, and catfish. The text also extensively covers dietary energy, water requirements for livestock, and feed milling. Because the text is thoroughly integrated, the reader gets the most complete education possible, and the video game feel makes the work of the ration balancing interactive and fun.

Traditional sources of animal feed include household food scraps and the byproducts of food processing industries such as milling and brewing. Scraps fed to pigs are called slop, and those fed to chicken are called chicken scratch. Brewer's spent grain is a byproduct of beer making that is widely used as animal feed. This new edition has been entirely revised to include the large amount of new research information that has become available since publication of the first edition. Three new chapters have been added, entitled Feeding and Health-Related Problems, The Complexity of Proper Bone Formation, and Exercise Physiology.

New feed and food crops, improved methods of production and processing, increased productivity of animals and crops, changes in animal products including more lean and less fat in meat and less fat in milk, longer shelf-life requirements of animal food products, and a myriad of new technological developments have resulted in a need to continually re-evaluate nutrient requirements and supplementation. Sample diets are given, useful as guides in developing diets for horses. Suggested levels of protein, minerals, and vitamins for use in horse diets are presented. These can be used as guides which can be modified to suit the various feeding situations encountered in horse farms. The volume of scientific literature is increasing rapidly each year. Moreover, its interpretation is becoming more complex. This increases the need for summarizing and interpreting these new developments in up-to-date books such as in this one.

Negasi Okoro

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## CHAPTER-1

# Introduction

Nationally, as well as internationally, there is a wide supply of commercial ration formulation programmes for almost any animal species. Most often the programmes are able to suggest a useable feed ration in a very short time and without to demand very much from the user besides the selection of relevant feeds from a table. For application in practise many of these programmes are appropriate, because in that case the result is what counts whereas the principles and methods behind are of no interest. Therefore commercial programmes focus on the result.

In teaching at advanced level, however, the situation is exactly the opposite. In that case, the final result is less important since the ration is not actually fed to animals anyway. Instead the basic principles of feeding and the method of combining feeds into a ration are the central element. A programme to be used in teaching should therefore put focus on the problem to be solved instead of the solution to the problem. This observation was the original starting point of the construction of a specialised programme for educational purposes.

ANIMAL FEED was originally planned to satisfy the following demands:

- **Generality.** The programme must be able to "speak" any language and apply to any animal species. When students have become used to the programme in for instance a course on a dairy cattle, they can apply the same programme later on in a course on pigs. Furthermore, the option of alternative languages makes the programme available to foreign students too.
- **Flexibility.** Decisions concerning grouping of animals, nutritional requirements, production functions, relevant feeds and "optimisation" method must be under the direct control of the user.
- **Accessibility.** It must be possible to use the programme without a comprehensive printed "User's Guide". On-line help must be available