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VZBVMS - VALENCIA SINGLETON

In the years since the third edition of this indispensable reference was published, a great deal has been learned about the nutritional requirements of common laboratory species: rat, mouse, guinea pig, hamster, gerbil, and vole. The Fourth Revised Edition presents the current expert understanding of the lipid, carbohydrate, protein, mineral, vitamin, and other nutritional needs of these animals. The extensive use of tables provides easy access to a wealth of comprehensive data and resource information. The volume also provides an expanded background discussion of general dietary considerations. In addition to a more user-friendly organization, new features in this edition include: A significantly expanded section on dietary requirements for rats, reporting substantial new findings. A new section on nutrients that are not required but that may produce beneficial results. New information on growth and reproductive performance among the most commonly used strains of rats and mice and on several hamster species. An expanded discussion of diet formulation and preparationâ€"including sample diets of both purified and natural ingredients. New information on mineral deficiency and toxicity, including warning signs. This authoritative resource will be important to researchers, laboratory technicians, and manufacturers of laboratory animal feed.

The world’s population is growing rapidly and consequently, there is an increasing demand for high-quality and safe food. At the same time, agricultural areas are diminishing due to industrialization, among other factors. Therefore, the efficiency of animal production needs to be improved. This book examines animal nutrition and ways to improve it. Topics covered include the use of feed additives in poultry nutrition, silage in dairy cattle nutrition, plant-origin feed additives in water buffalo nutrition, microbial inoculation in dairy cow nutrition, and more.

Recent Advances in Animal Nutrition: 1991 is an annual review of the changes and updates in the field of animal nutrition, especially progresses in the study of feeds. The book is divided into five parts. Part I discusses topics related to pig nutrition and feeds such as energy-protein interactions and improved utilization of amino acids.

Part II covers the nutrition and growth of poultry. Part III talks about the legislations concerned with feed manufacture, and Part IV deals with nutrition of different animals such as chicks and ruminants. The text is recommended for agriculturists, zoologists, and those involved in the development and manufacture of feeds who would like to know more about the nutrition of agriculturally important animals.

Part of the Biology of Growing Animals series, this book presents up-to-date information on the biology of animal nutrition. It describes how dietary modulation of the gastrointestinal function in young and growing farm animals is achieved through different kinds of feed additives, such as probiotics, prebiotics, organic acids, and novel sources of feed enzymes, as well as bioactive components and metabolic modifiers. The book also discusses the role of nutrition in immune response and animal health, the problem of antinutrients - including mucotoxins and some minerals - in animal nutrition, and the biotechnological, molecular, and ecophysiological aspects of nutrition. In addition, safety and legal aspects are presented. Critical review and state-of-the art articles written by recognized specialsists in animal nutrition and gastrointestinal physiology Novel approaches for improving gastrointestinal function in young farm animals New ways of interpretation of basic knowledge of nutrition

Dietary fibre has been associated with impaired nutrient utilisation and reduced animal performance. A minimum amount of dietary fibre is required to maintain normal physiological functions in the gastrointestinal tract. This book reviews the latest advances in the understanding of dietary fibre for animal nutrition. Fibre clearly has more value than was once thought. This book attempts to define not only the analytical constraints but also the advances in understanding its role in intestinal development and health in both swine and poultry. It identifies how we can exploit fibre to the advantage of the host. Stimulating the gastrointestinal microbiota (often referred to as the second brain) to digest more fibre creates a more favourable environment for intestinal health. This outcome is especially important in antibiotic free diets. The type of fibre employed, the use of exogenous enzymes and the interaction between them, the gastrointestinal microbiota and the host will be covered in detail throughout the chapters. This book discusses the practical application of this research and has been written for all animal scientists, nutritionists, feed producers and anyone interested in exploring new developments in the understanding of dietary fibre.

This comprehensive volume examines the interrelationships of nitrogen and energy nutrition of ruminants. It provides exhaustive coverage of basic concepts, applications, and new research developments. Rumen microbial activity is emphasized. The author, an expert in animal nutrition, discusses new systems of determining dietary energy requirements, the effect of processing feedstuffs, and stress factors. He reviews the availability of nutrients in grains, distillers' grain residues, oilseed meals, molasses, silages, pastures, crop residues, and aquatic plants. Growth stimulants, nutritional management of ruminants in feedlots and pastures, and the value of feed additives are also among the topics considered. The scope of coverage provided by this volume will make it the leading reference for teachers, research-

ers, consultants, livestock producers, feed manufacturers, and all others who are involved in ruminant feeding and nutrition. From the Preface: This volume covers research on various nitrogen and energy feedstuffs and defines terminology commonly utilized in nitrogen and energy nutrition. The utilization of nitrogen and energy in oilseed meals, fish meals, cereal grains, distillers' residues, molasses, silages, grasses, hays, crop residues, animal waste, and nonprotein nitrogen sources is discussed. Details are given on development and utilization of net energy systems, systems for balancing total nitrogen, and nonprotein nitrogen with total digestible nutrients (TDN) or energy components of ruminant diets. Discussions are presented on metabolism, feedlot, milking, and grazing trials. Growth stimulants, processing of feedstuffs, type of animal, and environmental and management factors that affect feed intake, growth, feed efficiency, and quality of product are reviewed. Emphasis is given to the contributions of ruminal microbes in upgrading forage and nonprotein nitrogen sources to higher-quality bacterial protein, as well as their ability to downgrade high-quality protein and waste nitrogen when protein is fed in excess of microbial needs. Research is presented on means to increase bypassing of the rumen to prevent nitrogen wastage when ruminants are fed concentrate diets. Contributions of ruminal microbes in utilizing cellulosic materials as lignocellulose and hemicellulose as well as starch and other carbohydrates are discussed.

Focusing on gut health in animals, his accessible study provides an overview of the potential benefits of phytogenic substances and plant-based feed additives to animal nutrition. This up-to-date and well-researched exploration focuses on the latest scientific knowledge regarding these additives and their potential use as flavoring agents and growth promoters in different animals worldwide, from pigs and poultry to ruminant mammals and aquatic species. It also highlights results from in vitro experiments as well as in vivo trials and shows how these tests have practical implication of phytogenic feeding concepts. Recognizing that the mechanisms in these additives are versatile and still need additional elucidation and scientific proof, this examination intends to help scientists and the feed industry further develop the group of feed additives.

Mineral Nutrition of Animals reviews the research on the mineral nutrition of animals. This book explores the biological function and metabolism of minerals in the body, as well as mineral feeding of various species of farm animals. Topics range from water metabolism and mineral composition of feeds to the physiological role of macroelements such as calcium and potassium and microelements such as iron and copper. This text is comprised of 16 chapters; the first of which provides a historical overview of the science of mineral feeding of animals; mineral elements and their function in animal nutrition; and mineral feeding of animals under industrial conditions. The chapters that follow present general information on minerals, describe the link between biogeochemical regions and biochemical ecology, and analyze the factors affecting the mineral composition of animals' bodies. The reader is also introduced to water metabolism and the water requirements of animals; the metabolism of minerals absorbed into the digestive tract; and the kinetics of mineral metabolism in the blood, organs, and tissues. The next section is devoted to miner-

al feeding of various species of farm animals such as cattle, sheep, pigs, and poultry. This text concludes by looking at methods of controlling the adequacy of farm animals' mineral diet. This book will be of interest to students and practitioners in agriculture and food science.

"Meeting livestock nutritional requirements is enormously significant in maintaining satisfactory performance of neonatal, growing, finishing and breeding animals. From a practical point of view, an optimal nutritional program should ensure sufficient intakes of amino acids (both traditionally classified essential and nonessential), carbohydrates, fatty acids, minerals, and vitamins by animals through a supplementation program that corrects deficiencies in basal diets (e.g., corn- and soybean meal-based diets for swine; milk replacers for calves and lambs; and available forage for ruminants). Also crucial to the nutrition program for animals is water. Modern breeds of dairy animals are able to produce huge amount of milk. In attempt to consume, digest and metabolize enough nutrients to satisfy lactation needs, those animals are exposed to serious stress conditions that can affect their health. Health problems which arise from those conditions are mainly related to impaired ability to metabolize enough nutrients to compensate for those lost in milk. They are known as metabolic or production diseases and may be of great economic importance in milk production systems. Although metabolic diseases have become a common problem on dairy farms, they still require a serious attention to be controlled. The incidences of these disorders can be reduced by proper nutrition of animals. Also, some of the specific strategies in feeding practice offer additional advantages in prevention of nutrition-related metabolic diseases. This volume Animal Nutrition is concerned with the animal feeds and their feeding describing research on feed for ruminants and non-ruminants, including poultry, horses, companion animals and aquatic animals. It encompasses the full coverage of animal nutritional sciences and reviews including, but not limited to, fundamental aspects of animal nutrition such as nutritional requirements, metabolic studies, body composition, energetics, immunology, genetics and molecular and cell biology related to nutrition, and more applied aspects of animal nutrition, such as raw material evaluation, feed additives, nutritive value of novel ingredients and feed safety. This book will be useful for students, researchers, teaching staff, practicing professionals connected with dairy science, animal science, food science, nutrition, physiology, biochemistry, veterinary medicine and other related fields. "

In agriculture, nutrition is crucial to meet increasing global demands for animal protein and consumer demands for cheaper meat, milk and eggs and higher standards of animal welfare. For companion animals, good nutrition is essential for quality and length of life. Animal Nutrition examines the science behind the nutrition and feeding of the major domesticated animal species. It includes introductory chapters on digestion and feeding standards, followed by chapters on each animal, containing information on digestive anatomy and physiology, evidence-based nutrition and feeding requirements, and common nutritional and metabolic diseases

Reflections on feeding body and spirit in a world of change Animal scientists have long considered domestic livestock to be too dumb to know how to eat right, but the

lifetime research of animal behaviorist Fred Provenza and his colleagues has debunked this myth. Their work shows that when given a choice of natural foods, livestock have an astoundingly refined palate, nibbling through the day on as many as fifty kinds of grasses, forbs, and shrubs to meet their nutritional needs with remarkable precision. In Nourishment Provenza presents his thesis of the wisdom body, a wisdom that links flavor-feedback relationships at a cellular level with biochemically rich foods to meet the body's nutritional and medicinal needs. Provenza explores the fascinating complexity of these relationships as he raises and answers thought-provoking questions about what we can learn from animals about nutritional wisdom. What kinds of memories form the basis for how herbivores, and humans, recognize foods? Can a body develop nutritional and medicinal memories in utero and early in life? Do humans still possess the wisdom to select nourishing diets? Or, has that ability been hijacked by nutritional "authorities"? Consumers eager for a "quick fix" have empowered the multibillion-dollar-a-year supplement industry, but is taking supplements and enriching and fortifying foods helping us, or is it hurting us? On a broader scale Provenza explores the relationships among facets of complex, poorly understood, ever-changing ecological, social, and economic systems in light of an unpredictable future. To what degree do we lose contact with life-sustaining energies when the foods we eat come from anywhere but where we live? To what degree do we lose the mythological relationship that links us physically and spiritually with Mother Earth who nurtures our lives? Provenza's paradigm-changing exploration of these questions has implications that could vastly improve our health through a simple change in the way we view our relationships with the plants and animals we eat. Our health could be improved by eating biochemically rich foods and by creating cultures that know how to combine foods into meals that nourish and satiate. Provenza contends the voices of "authority" disconnect most people from a personal search to discover the inner wisdom that can nourish body and spirit. That journey means embracing wonder and uncertainty and avoiding illusions of stability and control as we dine on a planet in a universe bent on consuming itself.

Vitamins in Animal and Human Nutrition contains concise, up-to-date information on vitamin nutrition for both animals and humans. The author defines these nutrients and describes their fascinating discovery, history and relationship to various diseases and deficiencies. Discussion of vitamins also includes their chemical structure, properties and antagonists; analytical procedures; metabolism; functions; requirements; sources; supplementation and toxicity. Vitamin-like substances, essential fatty acids and vitamin supplementation considerations are also examined. This book will be useful worldwide as a textbook and as an authoritative reference for research and extension specialists, feed manufacturers, teachers, students and others. It provides a well-balanced approach to both animal and clinical human nutrition and compares chemical, metabolic and functional aspects of vitamins and their practical and applied considerations. A unique feature of the book is its description of the implications of vitamin deficiencies and excesses and the conditions that might occur in human and various animal species.

The latest edition of Animal Nutrition has been updated thoroughly to provide a clear and comprehensive introduction to the science and practice of animal nutrition. This classic, market-leading text is a trusted resource for undergraduates studying Animal Science, Veterinary Science, Agriculture, Biology and Biochemistry. It is supported by key experimental evidence throughout about modern advancements in animal food nourishment, composition of foods and feeding standards for dairy and beef cattle, sheep, pigs and poultry, horses, and cats and dogs. It is split into six main sections covering: The components of food; The digestion and metabolism of nutrients; Quantifying the nutrient content of foods: digestibility, energy and protein values; The nutrient requirements of animals; The nutritional characteristics of foods; and Animal products and human nutrition. Quantitative aspects of the subject are clearly explained and illustrated by worked examples. Problems have been added to all chapters to aid student learning and the appendices include solutions to all chapter-end numeric questions. This edition includes nutritional topics related to molecular biology, the environment, and companion animals - dog and cat nutrition has been expanded. Under nutrient requirements of animals, usage of novel foods such as insects has also been added. Chapter-end summaries and questions allow students to recap and test their knowledge of the chapter topic.

This fifth edition now includes: modifiers of digestion and metabolism, an up-to-date summary of feed analysis, relevant emphasis on human nutrition and increased emphasis on tropical components.

The book provides comprehensive information about the different aspects of veterinary nutrition in tropical countries.The introductory chapter discuss the importance of nutrition, feeds and feeding of balanced and optimum feeds specifically required for the sustenance of life. The second chapter, discusses briefly the history of research in animal nutrition.The book further talks about the relationship between the environment and nutrition in animals; the chemical composition of plants and animals; and the various sources of feed for animals. It provides details on the different phases of life cycle in animals, and the effect of nutrition on the performance. Various Nutrients and its importance in livestock nutritionand production has been illustrated in details. Various nutrients such as water, carbohydrate, protein, fats, vitamins, minerals etc are individually dealt in a separate chapter. The digestive system,digestion and metabolism of carbohydrates, protein and fats in ruminant and non ruminant livestock have been illustrated. A dedicated chapter fully describes the activity of enzymes which are directly involved in nutrition. Also this book deals with the harmful components of animal feed which are found mainly in the unconventional feeds. The books also provide chapters like partitioning of feed& energy and also the therapeutic and clinical nutrition which are very importantfor the under graduate & post graduate students and researchers of animal nutrition and livestock production and management. This book is useful for researchers, undergraduate and post graduate students studying veterinary sciences, animal husbandry, zoology and biochemistry.

Animals are biological transformers of dietary matter and energy to produce high-quality foods and wools for human consumption and use. Mammals, birds, fish, and shrimp require nutrients to survive,

grow, develop, and reproduce. As an interesting, dynamic, and challenging discipline in biological sciences, animal nutrition spans an immense range from chemistry, biochemistry, anatomy and physiology to reproduction, immunology, pathology, and cell biology. Thus, nutrition is a foundational subject in livestock, poultry and fish production, as well as the rearing and health of companion animals. This book entitled Principles of Animal Nutrition consists of 13 chapters. Recent advances in biochemistry, physiology and anatomy provide the foundation to understand how nutrients are utilized by ruminants and non-ruminants. The text begins with an overview of the physiological and biochemical bases of animal nutrition, followed by a detailed description of chemical properties of carbohydrates, lipids, protein, and amino acids. It advances to the coverage of the digestion, absorption, transport, and metabolism of macronutrients, energy, vitamins, and minerals in animals. To integrate the basic knowledge of nutrition with practical animal feeding, the book continues with discussion on nutritional requirements of animals for maintenance and production, as well as the regulation of food intake by animals. Finally, the book closes with feed additives, including those used to enhance animal growth and survival, improve feed efficiency for protein production, and replace feed antibiotics. While the classical and modern concepts of animal nutrition are emphasized throughout the book, every effort has been made to include the most recent progress in this ever-expanding field, so that readers in various biological disciplines can integrate biochemistry and physiology with nutrition, health, and disease in mammals, birds, and other animal species (e.g., fish and shrimp). All chapters clearly provide the essential literature related to the principles of animal nutrition, which should be useful for academic researchers, practitioners, beginners, and government policy makers. This book is an excellent reference for professionals and a comprehensive textbook for senior undergraduate and graduate students in animal science, biochemistry, biomedicine, biology, food science, nutrition, veterinary medicine, and related fields.

Nutrition is the key driver of animal health, welfare and production. In agriculture, nutrition is crucial to meet increasing global demands for animal protein and consumer demands for cheaper meat, milk and eggs and higher standards of animal welfare. For companion animals, good nutrition is essential for quality and length of life. Animal Nutrition examines the science behind the nutrition and feeding of the major domesticated animal species: sheep, beef cattle, dairy cattle, deer, goats, pigs, poultry, camelids, horses, dogs and cats. It includes introductory chapters on digestion and feeding standards, followed by chapters on each animal, containing information on digestive anatomy and physiology, evidence-based nutrition and feeding requirements, and common nutritional and metabolic diseases. Clear diagrams, tables and breakout boxes make this text readily understandable and it will be of value to tertiary students and to practising veterinarians, livestock consultants, producers and nutritionists.

Embracing a wide range of disciplines, including physiology, biochemistry, veterinary medicine and feed technology, this book covers every type of farm animal found in both developing and developed countries, including cattle, sheep, pigs, chickens, goats, horses, fish, deer,

buffaloes, rabbits and camelids, as well as ducks, turkeys, ostriches and other birds. The encyclopedia contains approximately 2000 entries from 90 contributors. These entries range from short definitions to more discursive articles, all entries are fully cross-referenced to aid further research.
Animal nutrition is a fast changing field of expertise. Newly developed scientific knowledge is quickly adapted to better understand the integral balance between different organs and the digestive system. Society demands that the feed industry responds to consumer issues such as food safety, sustainability of animal production, animal health and welfare, carbon foot printing etc. via altering feeding programs. The practising nutritionist needs to implement this vast knowledge into practical feed formulations in a cost effective way in order to produce feeds and animal products efficiently. This book addresses current topics of interest to researchers and nutritionists in animal research, the feed and allied industry. This includes: immunomodulation, gut barrier functions in gut health, oxidative stress in weaned piglets, glutamine as an functional amino acid, energy evaluation of feedstuffs for layers, reduction of the risk of Salmonella infections, glucogenic nutrients as a predictor of milk production, reduction of methanogenesis in ruminants, glucose metabolism and insulin resistance in sows and much more. This reference book will be of vital interest to all involved in animal nutrition and the animal production industry.
PRINT/ONLINE PRICING OPTIONS AVAILABLE UPON REQUEST AT e-reference@taylorandfrancis.com Containing case studies that complement material presented in the text, the vast range of this definitive Encyclopediaencompasses animal physiology, animal growth and development, animal behavior, animal reproduction and breeding, alternative approaches to animal maintenance, meat science and muscle biology, farmed animal welfare and bioethics, and food safety. With contributions from top researchers in their discipline, the book addresses new research and advancements in this burgeoning field and provides quick and reader-friendly descriptions of technologies critical to professionals in animal and food science, food production and processing, livestock management, and nutrition.
The latest edition of this classic text, now in a larger format with improved artwork, continues to provide a clear and comprehensive introduction to the science and practice of animal nutrition. Animal Nutrition covers four main areas. Chapters 1-9 explain the basic chemistry and biochemistry of feed constituents, digestion and metabolism; Chapters 10-18 evaluate the energy and nutrient content of feedstuffs and discuss the assessment of nutritional requirements and ration formulation; Chapters 19-25 describe the characteristics of commonly used feedstuffs such as forages, concentrates and by-products; and the Appendix provides comprehensive tables on the composition of foods and feeding standards for dairy and beef cattle, sheep, pigs and poultry, and horses.
This comprehensive textbook and reference manual presents concise, up-to-date information on mineral nutrition for livestock and poultry, as well as comparative aspects with laboratory animals and humans. Chapters are organized by established and most common minerals, and present information on each mineral's history, properties, distribution, and natural sources, as well as their requirements,

metabolism, functions, deficiencies, supplementation methods, and toxicity for various animals. Those minerals for which naturally occurring deficiencies or excesses are known to be of economic importance are emphasized. A unique feature of this book is the description of the practical implications of mineral deficiencies and excesses, and of the conditions that might result. A large number of classic photographs illustrate mineral deficiencies and toxicities in farm livestock, laboratory animals and humans. Furthermore, it places strong emphasis on mineral supplementation in each chapter, and devotes an entire chapter to this subject.

Poultry and pig nutrition: challenges of the 21st century focuses on the important challenges animal production faces in the light of increasing global feed scarcity, climate change and improvements in animal welfare. Animal nutrition plays a critical role in providing answers to these 21st century challenges. Internationally leading authorities in nutrition and nutrition-related disciplines provide their views and solutions. New research areas are discussed and the current gaps in our knowledge are identified. Among the topics discussed are the use of microbes for natural solutions, the importance of individual feed intake determination, technological treatments of feed ingredients, and advances in modelling. In addition, authors provide their insights on the effects of environment/housing on animal functioning and the impact of climate change on the mycotoxin content of feed ingredients as well as the importance of pro- and antioxidant balance in animals. The increasing global demand for feed will increase the search for alternative feed ingredients especially new protein sources while for an environmentally sustainable human diet, life cycle assessment needs to be combined with other modelling techniques that address environmental impacts of dietary choices at the (inter)national level. Future challenges require new solutions and innovations, and this book contains a collection of ideas for our 21st century challenges.

Animal nutrition is a fast changing field of expertise. Newly developed scientific knowledge is quickly adapted to better understand the integral balance between different organs and the digestive system. Society demands that the feed industry responds to consumer issues such as food safety, sustainability of animal production, animal health and welfare, carbon foot printing etc. via altering feeding programs. The practising nutritionist needs to implement this vast knowledge into practical feed formulations in a cost effective way in order to produce feeds and animal products efficiently.This book addresses current topics of interest to researchers and nutritionists in animal research, the feed and allied industry. This includes: immunomodulation, gut barrier functions in gut health, oxidative stress in weaned piglets, glutamine as an functional amino acid, energy evaluation of feedstuffs for layers, reduction of the risk of Salmonella infections, glucogenic nutrients as a predictor of milk production, reduction of methanogenesis in ruminants, glucose metabolism and insulin resistance in sows and much more. This reference book will be of vital interest to all involved in animal nutrition and the animal production industry.

Human nutrition expert and author of the critically acclaimed What to Eat, Marion Nestle, Ph.D., M.P.H., has joined forces with Malden C. Nesheim, Ph.D., a Cornell animal nutrition expert, to write Feed Your

Pet Right, the first complete, research-based guide to selecting the best, most healthful foods for your cat or dog. Human nutrition expert and author of the critically acclaimed What to Eat, Marion Nestle, Ph.D., M.P.H., has joined forces with Malden C. Nesheim, Ph.D., a Cornell animal nutrition expert, to write Feed Your Pet Right, the first complete, research-based guide to selecting the best, most healthful foods for your cat or dog. A comprehensive and objective look at the science behind pet food, it tells a fascinating story while evaluating the range of products available and examining the booming pet food industry and its marketing practices. Drs. Nestle and Nesheim also present the results of their unique research into this sometimes secretive industry. Through conversations with pet food manufacturers and firsthand observations, they reveal how some companies have refused to answer questions or permit visits. The authors also analyze food products, basic ingredients, sources of ingredients, and the optimal ways to feed companion animals. In this engaging narrative, they explain how ethical considerations affect pet food research and product development, how pet foods are regulated, and how companies influence veterinary training and advice. They conclude with specific recommendations for pet owners, the pet food industry, and regulators. A road map to the most nutritious diets for cats and dogs, Feed Your Pet Right is sure to be a reference classic to which all pet owners will turn for years to come.

Enzymes in Human and Animal Nutrition is a detailed reference on enzymes covering detailed information on all relevant aspects fundamental for final use of enzymes in human and animal nutrition. Topics explored include selection, engineering and expression of microbial enzymes, effects of probiotics on enzymes in the digestive tract, potential new sources of enzymes, valorization of plant biomass by food and feed enzymes. Economics and intellectual property issues are also examined. Examines the role of enzymes in nutrition and in the production of food and animal feed so that food industry and academic researchers can understand applications of enzymes in the health of humans and animals Begins with a thorough overview of selection, engineering and expression of microbial enzymes Examines extremophile organisms as a potential new source of enzymes Includes discussion of analytics, economics and intellectual property to increase applicability of the rest of the book outside of the lab

This book covers hot topics in the nutrition and metabolism of terrestrial and aquatic animals, including the interorgan transport and utilization of water, minerals, amino acids, glucose, and fructose; the development of alternatives to in-feed antibiotics for animals (e.g., swine and poultry); and metabolic disorders (or diseases) resulting from nutrient deficiencies. It enables readers to understand the crucial roles of nutrients in the nutrition, growth, development, and health of animals. Such knowledge has important implications for humans. Readers will also learn from well-written chapters about the use of new genome-editing biotechnologies to generate animals (e.g., cows and swine) as bioreactors that can produce large amounts of pharmaceutical proteins and other molecules to improve the health and well-being of humans and other animals, as well as the growth and productivity of farm animals. Furthermore, the book provides useful information on the use of animals (e.g., cat-

tle, swine, sheep, chickens, and fish) as models in biomedical research to prevent and treat human diseases, develop infant formulas, and improve the cardiovascular and metabolic health of offspring with prenatal growth restriction. Editor of this book is an internationally recognized expert in nutrition and metabolisms. He has about 40 years of experience with research and teaching at world-class universities in the subject matters. He has published more than 660 papers in peer-reviewed journals, 90 chapters in books, and authored two text/reference books, with a very high H-index of 127 and more than 66,000 citations in Google Scholar. This publication is a useful reference for nutrition and biomedical professionals, as well as undergraduate and graduate students in animal science, aquaculture, zoology, wildlife, veterinary medicine, biology, biochemistry, food science, nutrition, pharmacology, physiology, toxicology, and other related disciplines. In addition, all chapters provide general and specific references to nutrition and metabolism for researchers and practitioners in animal agriculture (including aquaculture), dietitians, animal and human medicines, and for government policy makers.

By 2050 the world's population is projected to grow by one-third, reaching between 9 and 10 billion. With globalization and expected growth in global affluence, a substantial increase in per capita meat, dairy, and fish consumption is also anticipated. The demand for calories from animal products will nearly double, highlighting the critical importance of the world's animal agriculture system. Meeting the nutritional needs of this population and its demand for animal products will require a significant investment of resources as well as policy changes that are supportive of agricultural production. Ensuring sustainable agricultural growth will be essential to addressing this global challenge to food security. Critical Role of Animal Science Research in Food Security and Sustainability identifies areas of research and development, technology, and resource needs for research in the field of animal agriculture, both nationally and internationally. This report assesses the global demand for products of animal origin in 2050 within the framework of ensuring global food security; evaluates how climate change and natural resource constraints may impact the ability to meet future global demand for animal products in sustainable production systems; and identifies factors that may impact the ability of the United States to meet demand for animal products, including the need for trained human capital, product safety and quality, and effective communication and adoption of new knowledge, information, and technologies. The agricultural sector worldwide faces numerous daunting challenges that will require innovations, new technologies, and new ways of approaching agriculture if the food, feed, and fiber needs of the global population are to be met. The recommendations of Critical Role of Animal Science Research in Food Security and Sustainability will inform a new roadmap for animal science research to meet the challenges of sustainable animal production in the 21st century.

"Animal Nutrition Science introduces the fundamental topics of animal nutrition, in a treatment which deals with terrestrial animals in general. The subjects covered include nutritional ecology and the evolution of feeding styles, nutrients (including minerals, vitamins and water) and their func-

tions, food composition and methods of evaluating foods, mammalian and microbial digestion and the supply of nutrients, control and prediction of food intake, quantitative nutrition and ration formulation, methods of investigating nutritional problems, nutritional genomics, nutrition and the environment, and methods of feed processing and animal responses to processed foods." -- Publisher's description.

The primary purpose of each of the subsequent chapters of this book is to promulgate quantitative approaches concerned with elucidating mechanisms in a particular area of the nutrition of ruminants, pigs, poultry, fish or pets. Given the diverse scientific backgrounds of the contributors of each chapter (the chapters in the book are arranged according to subject area), the imposition of a rigid format for presenting mathematical material has been eschewed, though basic mathematical conventions are adhered to.

Each year the University of Nottingham hosts the highly successful Feed Conference, upon which these volumes are based. On each occassion invited experts from around the world address a number of topical issues.

* covers the essentials of nutrition in an impartial and lighthearted way * user-friendly layout makes animal nutrition interesting and fun, helping students easily understand the principles of nutrition * includes excellent section on the nutritional needs of small furries with previously unpublished material * essential reading for every veterinary undergraduate and veterinary nurse * deals with all areas covered in the City & Guilds Small Animal Nutrition Certificate

If you have ever wondered why animals prefer some foods and not others, how poor feeding management can cause conditions such as laminitis, rumenitis or diarrhoea, or how to construct a diet to optimise animal performance and health, then this book will introduce you to the fundamentals of animal nutrition and their practical implementation. With its evidence-based approach and emphasis on the practical throughout, this is a valuable textbook for undergraduate and graduate animal science students studying the feeding of farm animals. It is also an essential reference for early practitioners, veterinarians, farm managers and advisers in animal feed companies.

Fats in Animal Nutrition provides a useful text containing information from many diverse disciplines that discuss the nutritional utilization of lipids of domesticated animals. The book is divided into seven parts. Part I covers the chemistry and biochemistry of animal and plant fats and their nutritional importance; Part II discusses the general principles involved in the transport and absorption of fats and how this process is facilitated in ruminant and non-ruminant animals. The book also deals with the role of essential fats in the nutrition of different animals, as well as the protective functions of fat-soluble vitamins . Part IV discusses the use of fats as an energy source for animals; Part V deals with the inclusion of fats in animal feeds and their uses. The deposition of fat in different meats and the practical applications of fat utilization in animals are covered as well. The text is recommended for agriculturists, veterinarians, and zoologists who would like to know more about the importance of the inclusion of fats in animal diets.

The science of animal nutrition has made significant advances in the past century. In looking back at the discoveries of the 20th

century, we can appreciate the tremendous impact that animal nutrition has had on our lives. From the discovery of vitamins and the sweeping shift in the use of oilseeds to replace animal products as dietary protein sources for animals during the war times of the 1900s-to our integral understanding of nutrients as regulators of gene expression today-animal nutrition has been the cornerstone for scientific advances in many areas. At the milestone of their 70th year of service to the nation, the National Research Council's (NRC) Committee on Animal Nutrition (CAN) sought to gain a better understanding of the magnitude of recent discoveries and directions in animal nutrition for the new century we are embarking upon. With financial support from the NRC, the committee was able to organize and host a symposium that featured scientists from many backgrounds who were asked to share their ideas about the potential of animal nutrition to address current problems and future challenges.

This book is a unique cross fertilization of aquatic ecology and aquaculture. It shows how diets structure the digestive tract and its microbiota and, in turn, the microbiota influences life history traits of its host, including behavior. Short-term starvation can have beneficial effects on individuals themselves and succeeding generations which may acquire multiple stress resistances – a mechanism strengthening the persistence of populations. From terrestrial, but not yet from aquatic animals, it is understood that circadian the rhythmicity makes toxins or good food. On the long-term, the dietary basis impacts succeeding generations and can trigger a sympatric speciation by (epi)-genetics. This volume defines gaps in nutritional research and practice of farmed fishes and invertebrates by referring to knowledge from marine and freshwater biology. It also points out that dietary benefits and deficiencies have effects on several succeeding generations, indicating that well designed diets may have the potential to successfully improve broodstock and breeding effort.