About the Book

Livestock raising is undergoing a phenomenal change during last few years. Its economic importance has further increased and likely to zoom in coming years. The population growth, urbanization, change in dietary preferences and increased income, have driven the demand for foods of animal origin. Feed and fodder supply still remains the most critical impediment in the growth of livestock industry in the country. Overall deficiency in feed supply remains around 50%. The current production of compound feed from the feed manufacturing sector is only to the tune of 10 million tones per year against a conservative demand of 40 million tones. In present scenario it appears imperative to give a immediate filip to the feed production. The editors in the present book have contemplated the available informations contributed by learnered experts in their field. The book cover the topics like cereal availability, processing, gelatinization, extrusion technology, codex alimentarius, protection of fats and protens, urea molasses mineral block technology, antrinutri-nutional factors, processing for pig feeding liquid feed handing storage losses, mineral mixture preparation, agro-industrial by products, feed microscopy, probiotics, herbal feed additives etc. It is expected that the book will be equally useful to research scientist in engineering, animal nutrition, students and feed manufacturing industries alike.

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ANIMAL FEED TECHNOLOGY

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SSPH

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Editors :

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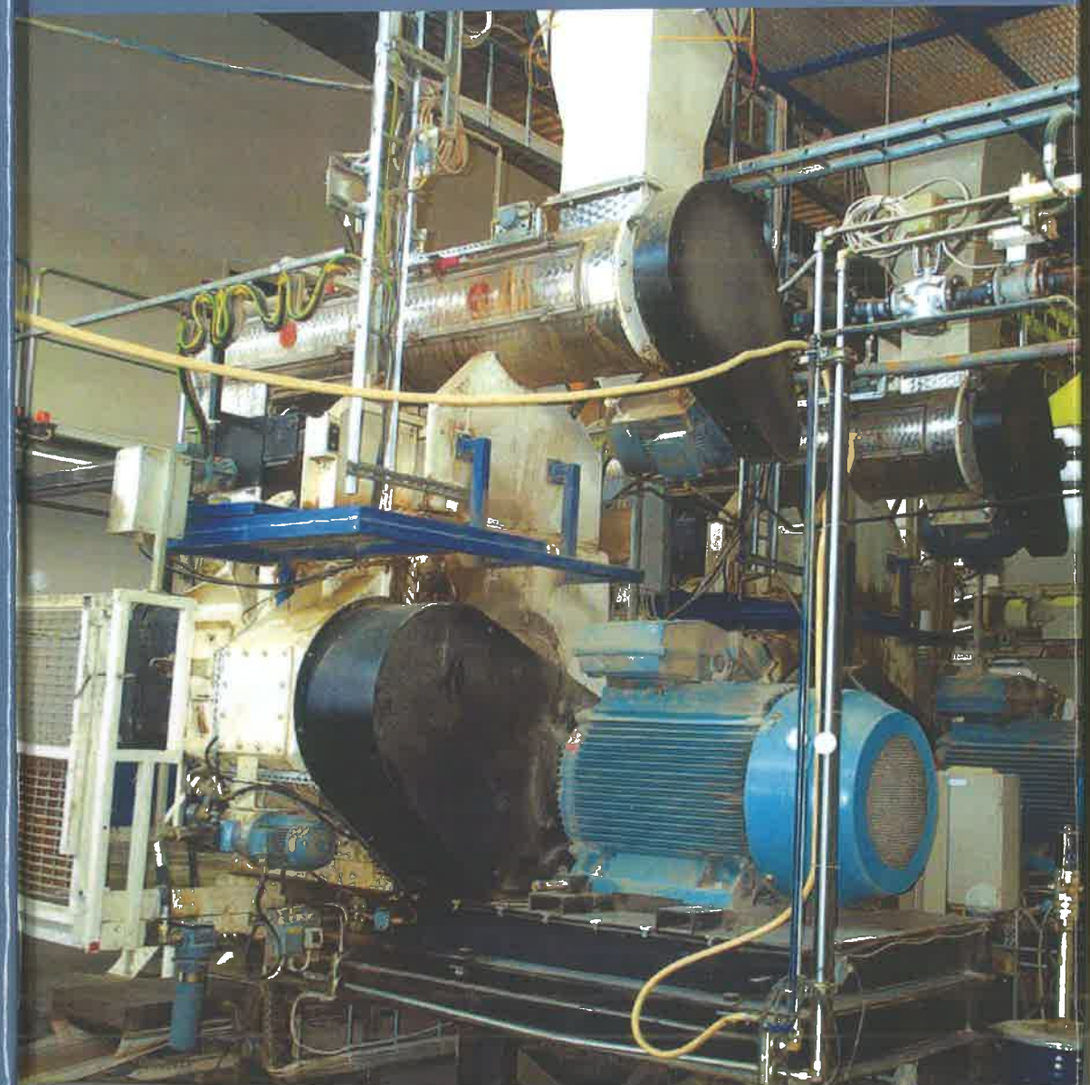

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He is recipient of ICAR Team Research Award for outstanding research in the area of agricultural sciences (Natural Resource Management) in the year 2002. He has almost 265 research publications including 16 books (edited) and 2 books authored to his credit. Currently, as Director of Indian Grassland & Fodder Research Institute (IGFRI), Jhansi. He is guiding and managing research in the area of forage production and its utilization in the country since July 2000.

PREFACE

Both livestock and human population have attained an increasing streak in the post independent era of the country. India has registered a marked growth in the development and diversification of industrial sector. Livestock rearing has undergone a metamorphosis that has put the India on the top position in the milk production. To cater the need of increasing population for animal origin food, sustainability coupled with higher livestock production is of paramount importance. There are several obstacles in maintaining the pace of livestock production to match the increasing demand of food of livestock origin, but supply of feed and fodders and poor genetic makeup are the most critical. The present supply of compound feed from feed manufacturing sector is only 10 million tones. There is ample scope to boost the animal feed manufacturing industries that needs a cohesive interaction and coordination among the researchers, engineers, policy makers and feed manufacturers. The editors of the book "Animal Feed Technology" have made an attempt to organize and synthesize the information contributed by engineers, nutritionists, feed manufacturers in their respective areas of expertise. Subject matter of the book comprises of cereal processing, pelleting, protected nutrients technology, probiotics, feed resources, feed quality standards, gelatinization, extrusion technology, anti-quality factors in feeds, liquid feed handling, feed microscopy, feed purchase procedures, codex alimentarius, agro-industrial byproducts, processing techniques etc. Thus the compiled information in the book will provide the complete scenario of the Indian feed industry specially in terms of present scientific know how on machinery, processing techniques, compound feed quality, feed supplementation and future thrusts of animal feed science and technology aspects. The editors extend special thanks to contributors for their contribution in form of different chapters.

The encouragement and blessings poured by honorable Director General, ICAR and Secretary DARE, Dr. Mangala Rai ji; Dr. G. Kalloo, Deputy Director General (Crop Sciences); Dr. V. K Taneja, Deputy Director General (Animal Sciences) and Dr. S. N. Shukla, ADG are gratefully recorded. It's pleasure in extending thanks to Department of Science and Technology and especially to Dr. V. P. S. Tomar and Dr. J. K. Sharma advisors for their financial support to enable us to arrange this workshop to discuss different aspects of the subject.

It is our duty to thank the advisors namely Dr. K Pradhan, Dr. S. K. Ranjhan, Dr. V. K. Singh, Dr. V. D. Mudgal Dr. S. M. Ilyas, Dr. N. N. Patahak for their advice in finalizing the contents of the book.

It is pleasure in extending the thanks to our colleagues namely Dr. N. C. verma, Dr. B. K. Bhadoria, Dr. A. B. Majumdar, Dr. L. K. Karnani, Dr. B. P. Kushwaha, Dr. A. K. Mishra, Dr. S. B. Maity, Dr. N. P. Singh, Dr. K. K. Singh, Dr. A. K. Samanta, Dr. M. M. Das, Dr. G. H. Pailan, Dr. S. K. Nag and students/ staff especially Dr. Ranjan Kumar, Chanderbhan and Sudheer for their help at different stages in preparing the book.

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CONTENTS

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STATUS OF FEED INDUSTRY

D.D. Sharma

India is the richest in livestock wealth (201 million cattle, 98 million buffaloes) and is the largest milk producing country in the world. The annual milk production has crossed 88 million tones this year and expected to produce 150 million tones by the year 2020, but milk produced by individual lactating animal is just at the bottom. The low productivity of livestock, which is a matter of great concern, in the country is due to unsustainable breeding, uncomfortable housing, inadequate feeding and inefficient herd management systems. Efforts have been made in several Research Institutes as well as Agricultural Universities to develop new technologies to improve productivity in cattle and buffaloes. Most of the techniques are still on laboratory premises but few have percolated in developing cattle feed industry as well as management of dairy animals.

Indian Cattle Feed Industry

Feed Industry in India is just four decades old and mainly caters to Dairy and Poultry, but more recently to Aquaculture also. The development in this sector initiated after the formation of Compound Livestock Feed Manufacturers' Association (CLFMA) during June, 1967 with 180 members on roll. The primary focus of the Feed Milling Industry in the present era is to firmly position into food chain and assure to the consumers to produce products that are friendly to animals, consumers and environment. Out of total cattle and buffalo population, hardly 10 million crossbred cows, 15 million improved cows and 36 million improved buffaloes require good quality compound feed. In India, the present demand of total feed by a conservative estimate is 45 million tones. However, presently, only 10 million tones of feed is produced by different agencies (Members of CLFMA, Members of State Cattle Feed Manufacturers Association, Government Institute Farms, Progressive Dairy Farms). Some of the demand is met through on farm mixed feed. The remaining lot gets feed in the form of single feed ingredient available locally (either oil cake or wheat grain or bran). Even the improved animals kept on compound feed, also gets additional supplement as top feed available at home.

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