

NUTRIENT MANAGEMENT STRATEGIES INTEGRATED FARMING SYSTEMS

**Author Name: B. K. DESAI,
SATYANARAYAN RAO, B. M.
CHITTAPUR**

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FOREWORD



Dr. B.V. Patil
Vice-Chancellor
UAS, Raichur

The glory of green revolution in India is proved to be a turning point in improving the food scenario from 'begging bowl to self sufficiency'. The concerted efforts of the farm scientists have further able to address the second generation issues and helped to enhance and sustain productivity so far. However, the challenge of ever increasing population and its pressure on food front has been accentuated due to industrialization and urbanization which have reduced the land available for tilling. It is not just agricultural production, but the quality of food grains as well as animal products and industrial raw material is of paramount importance. Therefore, we cannot just focus on individual components as we did during the era of Green revolution but have to concentrate on other components of agriculture in totality. In other words today, agriculture needs second revolution on all fronts on the farm with holistic approach with the aim for rainbow revolution. This pin points to system approach, and collaborative research of farm scientists involved in agriculture. This is going to help a long way in increased farm production on sustained basis as well as socially acceptable, environmentally friendly, and economically feasible and globally fulfilling also. Even in the global alarm of changing climate farming system approach is going to help the resource poor former in the tropical climate and if this system approach neglected any further, the survival of rural poor will be at stake.

Research of farming system was initiated in the south particularly in paddy eco system during eighties with ICAR funding in Tamil Nadu. On the same lines research was also initiated in TungaBhadra project command again for paddy ecosystem at Agricultural Research Station, Siruguppa coming under the University of Agricultural Sciences, Raichur. Nevertheless, a need was also felt for such research for other areas both for rainfed and irrigated ecosystems. Therefore, immediately with formation of university during 2009 a project was submitted to Government of Karnataka for establishment of IFS units on farms keeping one ha of land and a farm family as base. Later on the university also started empowering farmers on integrated farming system in all

the six districts of Hyderabad Karnataka from the last year.

Therefore, I take this opportunity to appreciate the painstaking efforts of Dr. B.K. Desai, Professor and Head (Agronomy), the Director of winter school on 'Nutrient management Strategies in Integrated Farming System, and Principal investigator, Project on Integrated Farming System, RKVY (GOK), and his team in bringing out the compendium of lecture notes into two volumes which I hope will certainly form the bases for research on farming systems as a holistic yet dynamic model. Scientists from different faculties and agroecological regions have shared their experiences and the state of art. This forms the core of the compendium and hence, will definitely meet the needs of researchers, students, teachers and all those who strive for the holistic development of farm holding.

Finally, Congratulations on the great endeavour, and all the best.

December 23, 2012



(Dr. B. V. Patil)

PREFACE



Dr. B.K. Desai

Course Director & Professor and Head
Department of Agronomy,
College of Agriculture, Raichur

The diverse challenges and constraints namely growing population, increasing food, feed and fodder needs, natural resource degradation, climate change, new parasites, slow growth in farm income and new global trade regulations demand a paradigm shift in present agriculture system. Soil fertility decline and mismanagement of plant nutrients have made the task of providing food for the world's population in 2020 and beyond more difficult. The production of food grains per unit area has to almost double from what we are obtaining today. Therefore, pertinent and necessary to integrate our cropping fields with alternate income generating activities. Traditionally, the farming systems were sustainable; however, these farming systems are changing rapidly from one of mixed crops and livestock to intensively irrigated crops. Hence, it is required to integrate livestock/pasture into cropping systems to ensure the long term productivity of the land. This signifies the optimization of various agricultural components and their integration for multi-enterprise farming systems. Further development of sustainable farming practices for enhanced soil health, and resource use efficiencies under diverse farming situations and farm categories is also of paramount importance.

Keeping all these in view, ICAR sponsored winter school on “**Nutrient Management Strategies in Integrated Farming Systems**” is being organized from 3rd -23rd, December, 2012 for 21 days at the Department of Agronomy, College of Agriculture, Raichur, University of Agriculture Sciences, Raichur, with an objective to disseminate first-hand information on the state of the art on nutrient management in farming systems, development of local manurial resources and to study their contribution towards nutrient supply in farming systems, to highlight the innovative approaches to support and promote integrated plant nutrient management in integrated farming systems and to emphasize the use of novel approaches *viz.*, Agro-

informatics, Precision Farming and Integrated Crop Management techniques as tools of nutrient management. The comprehensive contents of this compendium have been planned with a definite purpose to help farmers and scientists of our country.

I express my sincere gratitude to Dr. B.V. Patil, Hon'ble Vice-Chancellor, UAS, Raichur for his consistent support, encouragement and guidance during the course of this Winter School. I take this opportunity to thank the Education Division of ICAR, New Delhi for sponsoring the Winter School. I am grateful to Dr. S.G. Patil, Dr. B.S. Janagoudar, Dr. K.P.Vishwanath, Dr. L.B.Hugar, Dr. M.K.Naik, Dr.B.M.Chittapur, Dr.B.T.Pujari and Dr. P. Balakrishnan for their kind support.

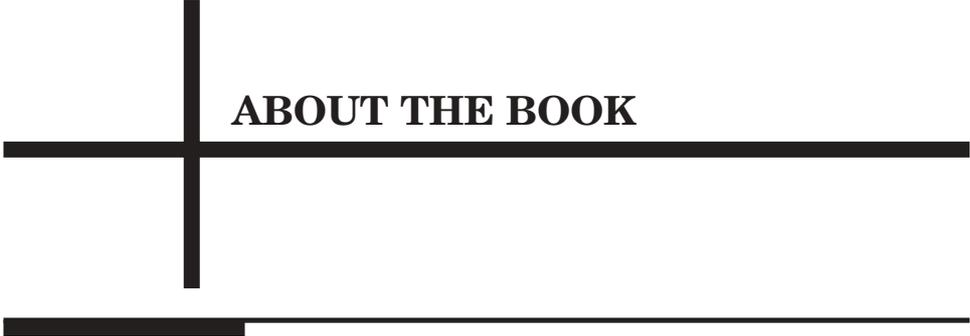
The immense help rendered by Course Coordinators Dr. A. S. Halepyati, Dr. Satyanarayana Rao, Dr. K. Narayana Rao and Dr. Prahlad Ubhale is thankfully acknowledged. Special thanks are also due to the plethora of resource persons of the Winter School for their enlightening presentations and lucid technical information forming the core of this compendium. The support rendered by staff members of the Department of Agronomy and College of Agriculture is appreciated at this moment. I acknowledge the support of Administrative, Finance and Accounts, Technical and Supporting staff for organising the Winter School.

Place: Raichur

Date: 23-12-2012

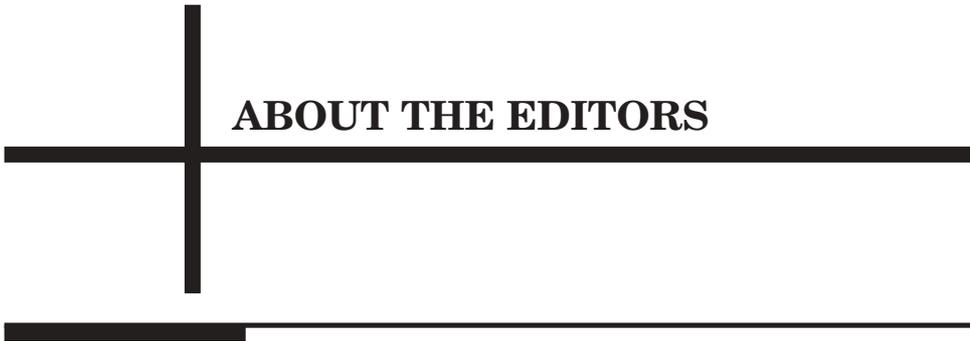


(B.K. Desai)
Course Director



ABOUT THE BOOK

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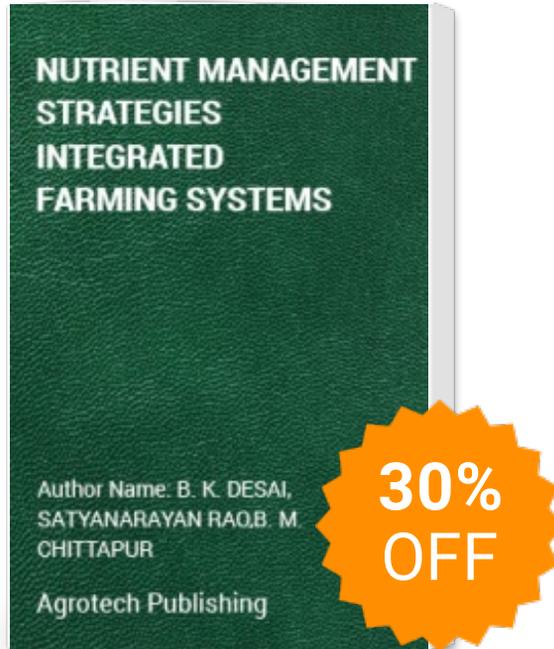
ABOUT THE EDITORS

Dr.B.K.Desai is presently working as Professor and Head, Department of Agronomy at University of Agricultural Sciences, Raichur, Karnataka. He has completed his B.Sc. (Agri.) and M.Sc. (Agri.) with distinction. He obtained his Ph.D. during 1998 and is specialized in the field of soil fertility management and Agro forestry systems. He has awarded e-India-2010 for the NAIP-ICT project as CCP. He has multi experience in teaching, Research and Extension of over 24 years and made significant contribution to the Development of Integrated Farming System modules, Integrated Crop Management Practices in Pigeonpea, cotton etc. He has organized one National level Winter School training programme on Nutrient Management Strategies in IFS to the scientists of SAU's and ICAR institutes. He has 24 years of teaching experience of various Agronomy courses *viz.*, sustainable agriculture and farming systems, rainfed agriculture and watershed management, experimental techniques in agriculture research to under graduate, postgraduate and Ph.D. students. He has guided 12 M.Sc. and 2 Ph. D. students who have worked on integrated nutrient management, green manuring, cropping systems and integrated weed management etc. He has over 90 research/symposia papers, 15 chapters in national and international journals, 3 books as author/editor, 60 popular articles and other useful publications.

Dr. Satyanarayan Rao M.Sc. (Agri.) and Ph.D. in Agronomy is presently working as Associate Professor of Agronomy in University of Agricultural Sciences, Raichur, Karnataka. After completion of his education, he has been engaged in research, teaching and extension activities for the last 23 years. He has guided 6 M.Sc. students. His field of specialization is mainly Soil Fertility and Plant Nutrition, Integrated Nutrient Management, recycling of organic wastes and crop management etc. Presently he is actively involved in Organic Agriculture and Integrated Farming System research fields apart from farm management activities. He has to his credit over 50 Scientific articles published in reputed Journals. He has successfully completed several research projects as Principal Investigator and co- Principal Investigator.

Dr. B.M. Chittapur. Presently working as Professor and Head, Department of Agronomy, University of Agricultural Sciences, Raichur, Karnataka has three decades of experience in teaching, research and farm extension. Also worked as Dean (Agri.), College of Agriculture, Bheemarayanagudi for three and half years. He worked on soil solarization for his Ph.D. A recipient of Gold Medal for his Masters Degree and has a meritorious academic carrier throughout. Handled many research projects in different fields of agronomy from weed management to cropping systems. Guided Ph. D. students on new emerging technologies such as use of remote sensing and GIS in crop production, yield forecast and acreage estimation. One of the Ph. D. theses has been awarded as 'Best Thesis' from the Indian Society of Agronomy, New Delhi. So far 15 Masters and 4 Doctoral students obtained their degrees under his guidance. He has over hundred research papers and half a dozen of books besides useful publications for farming community.

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Author : B. K.
DESAI, SATYANARAYAN
RAO, B. M. CHITTAPUR

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