DRYLAND HORTICULTURE: CULTIVATION AND MANAGEMENT

Dryland Horticulture

Cultivation and Management

Editors

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Preface

The horticulture sector has witnessed phenomenal growth in production and productivity during the last two decades. In India, it is recognized as one of the fastest-growing sectors. The production has reached 320.9 million tonnes in 2019-20 (2nd revised estimate) as compared to 231 million tonnes in 2010. India is the second-largest producer of fruits and vegetables after China in the world. Progressive urbanization, increased spendable income and awareness for balanced and nutritious food have contributed towards increasing demand for horticultural produce. The increasing demand coupled with higher economic returns per unit areas has triggered this growth pattern, which has been largely possible due to the policy environment to support horticulture both for research and development.

Presently, there is a tremendous scope in the expansion of horticultural crops in dryland areas and it has vast potential for changing the scenario of horticulture of the country. Vast land resources, surplus family labours, increasing canal irrigated area, developing infrastructure facility, plenty of solar and wind energy, etc are the strength of this dry region. The low incidence of diseases and insects in the region is a good source for the production of seed and planting materials. There are a number of fruits crops that can be grown successfully in the dry arid region to achieve better returns.

This book is an outcome of the lectures contributed by the learned and eminent Scientists, Senior Scientists, Principal Scientists/Professors, HODs, Directors who delivered talk in ICAR sponsored winter school on "Hi-tech approaches for production and value addition of horticultural crops in arid and semi-arid regions" organized by SKRAU, Bikaner from 7-27 November 2019. The authors gratefully acknowledge their contributions to providing the latest information in the chapters. The edited book entitled "Dryland Horticulture: Cultivation and management" has been written to provide adequate knowledge of topic like status and scope of dry land horticulture, soil problems of dryland area, cultivation practices of dry land fruits crops

viz. Ber, aonla, pomegranate, date palm, citrus spp., guava, bael, jamun, custard apple, ramphal, lasoda, wood apple, kair, pilu, aloe vera etc. The book also covers tuber crops vegetables and flowering plants of dryland areas. This book gives comprehensive, latest and update knowledge of the dryland crops and will guide students for competitive examinations and postgraduate studies.

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Prof. Raksha Pal Singh
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About the Editor(s)

DR. RAJENDRA SINGH RATHORE graduated from S.K. Rajasthan Agricultural University, Bikaner, Rajasthan. He did his Master's degree from the same University in 2001 and awarded with Gold Medal. He did his Doctorate degree from Maharana Pratap University of Agriculture and Technology, Udaipur. Dr Rathore joined Maharana Pratap Univesity of Agriculture and Technology, Udaipur as Assistant Professor in the year 2005 and served 13 years in the field of research, teaching and extension in different stations of University. Dr Rathore has joined Swami Keshwanand Rajasthan Agricultural University, Bikaner as Associate Professor in March 2018. Presently, he has been working as Associate Professor (Horticulture) in AICRP on Arid Zone Fruits at Agricultural Research Station, Bikaner. Dr. Rathore has published 35 research papers in different journals of high repute, one textbook, one edited book, one souvenir & abstracts compendium and fifty popular articles. He is an expert author in "CSTT Comprehensive Glossary: Volume- XVII- Agriculture Sciences A-Z" published by CSTT, Ministry of Human Resource Development, Department of Higher Education, Govt. of India. Dr Rathore has been awarded the Outstanding Scientist award by the Vice-Chancellor, MPUAT, Udaipur, and the District Collector, Chittorgarh (Rajasthan). He has received Young Scientist awards-2016 from Gramin Vikas Avam Siksha Prasar Samiti, Agra (U.P), Young Scientist award-2017 from Society of Human Resource and Innovation, Agra, Distinguished Scientist award from SWIFT, Meerut and Fellow of SHRD-2019 from Society for Horticultural Research and Development (SHRD), Ghaziabad. Dr. Rathore received one "Best Research Paper" award and two "Best Poster Paper Award" in different national conferences. Dr. Rathore successfully conducted two ICAR sponsored winter school, one as Course Director and one as Course Coordinator and organized three National Webinars. He has popularized kinnow mandarin and custard apple cultivation technologies in the Southern region of Rajasthan state. He is a life member of eight reputed societies in the field of agriculture.

PROFESSOR RAKSHA PAL SINGH, a renowned agricultural scientist, academician and research manager has been working as Vice-Chancellor, Swami Keshwanand Rajasthan Agricultural University, Beechwal, Bikaner-334006, Rajasthan, India since August 2019. Professor Singh graduated from Agra University in 1985, obtained a Master degree in 1988 from Meerut University and thereafter PhD in Agricultural Extension (1996) from B. R. Ambedakar University, Agra U. P. Besides Prof. Singh was conferred with the Post P.G. Diploma in Mass Communication and Journalism from Kendriya Hindi Sansthan, Ministry of Human Resource Development, Govt. of India, Agra, Uttar Pradesh.

Prior to this prestigious assignment, Prof. Singh served as Professor & Head, Agril. Extension, Senior Scientist & Head, Associate Director Extension in Sardar Vallabh Bhai Patel University of Agriculture & Technology, Modipuram, Meerut, Uttar Pradesh. Prof. Singh has vast Teaching/Research/Extension/Administrative experience towards developing research tools & techniques through 15 externally funded research projects. He has expertise in areas of Socio-economic-psychological issues in agriculture and rural development, information communication technology (ICT), human resource management, participatory development & leadership, farming system research etc. He organized more than 1500 On/Off/Rural Youth/ Extension functionaries training. He has developed 30 training manuals and 18 success stories. Prof. Singh has more than 200 publications including books, book chapters, magazines and research papers in prestigious journals of National and International repute.

Prof. Singh also served in the professional societies in different capacities and also endowed with various prestigious awards and recognition for his outstanding contribution in the field of extension research, field extension services, extension education teaching and training and farm advisory services under transfer of technology and participatory research like ISEE Fellow Award, Young Scientist Award, Dr. O.P. Dhama Memorial Award, Best KVK Scientist Award, Dr. K.N. Singh Memorial Award and Dr. G.S. Vidyarthi Memorial Award by Indian Society of Extension Education, ICAR-IARI, New Delhi. Besides he has also been awarded the Scientist of the Year, Fellowship Award, Best Environmental Conservation Award, Best paper presentation awards and International Fellow Award. He has international exposure and acted as chief guest in an International Seminar.

He is honoured with the Life Time Achievement award by the Indian Society of Extension Education on the occasion of ISEE National Seminar 2019 by Hon'ble Chancellor and Governor of Rajasthan Shri Kalraj Mishra.

During his short span of time, his contribution to the development of the university is widely acknowledged specially by the farming community of the area.

DR. PRAVEEN K SINGH has studied at Prestigious Agriculture Colleges and Universities. He started his professional career in the corporate sector, where he got an opportunity to get familiar with many advance technologies in horticulture. He joined Rajasthan Agricultural University, Bikaner as Assistant Professor (Horticulture) and got sanctioned one project from the Department of Biotechnology, New Delhi ("Biotechnological interventions for sustainable income and employment generation in Rural Desert of Rajasthan").

Later he joined ICAR-Indian Institute of Vegetable Research, Varanasi, as Senior Scientist, where he also served as Officer-Incharge, IIVR-Regional Research Station, Sargatia, Kushinagar, UP. Presently he is working as Principal Scientist (Hort: Vegetable Science) at Center for Protected Cultivation Technology, ICAR- Indian Agricultural Research Institute, Pusa, New Delhi.

He was awarded the Young Scientist Associate Award - 2012 by Bioved Research Society, Allahabad. Certificate of Excellence, 5th Academic Achievement Awards-2017 by Education Expo TV, Mumbai and Outstanding Horticulturist award-2018 from SHRD, Gaziabad, UP

He has conducted twelve germplasm collection Explorations in landlocked and difficult areas and collected more than 500 accessions of different horticultural crops. Apart from exploration, collection and maintenance of germplasm, he has been involved in systematic and genetic improvement studies in Trichosanthes, leafy vegetables, Momordica dioca (Kartoli) and Momordica subangulata var. Renigera (Kakrol), Indian cauliflower, vegetable soyabean, tropical radish and carrot.

He has got registered several elite materials and notified varieties to his credit. Some of the very promising elite material like a male sterile line in Asiatic carrot, cluster bearing sponge gourd have been registered with NBPGR. Several genotypes are being utilized in the crop improvement program. Ridgegourd (satputia): Kashi Khushi, Sponge gourd: Kashi Shivani, Watermelon: Kashi Pitamber, Longmelon: VRSLM-27, Spine gourd: Kashi Haritika, Sweet gourd: Kashi Gautam were identified at the Institute level for release.

He has been published One Book, 35 Research papers, 50 Popular articles, 6 Book Chapters, 6 pamphlets etc.

He is a life member of several scientific societies and participated in many National and International seminar, conferences, symposiums to deliver invited and lead lectures.

DR P.S. SHEKHAWAT graduated and Masters from prestigious Rajasthan College of Agriculture, Udaipur, RAU Bikaner and he did doctorate degree from G.P. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand. He started his professional carrier from an international organization Indo-Swiss Goat and Fodder Production Project at Ramsar, Ajmer (Rajasthan) as a Research Assistant. During this project he got opportunity to familiar with different organizations and learnt many advance technology in crop production system. After that he joined as an Assistant Agricultural Research Officer (Agronomy) in Department of Agriculture, Govt. of Rajasthan. Dr. Shekhawat joined Rajasthan Agricultural University Bikaner as Assistant professor (Agronomy) in the year 1992. Dr Shekhawat had handled an international project "Indo-Dutch drainage Project" at Hanumangarh district of Rajasthan. He also worked as farm Incharge at ARSS Hanumangarh and ARS Bikaner for a long period. In 2006 he was promoted to Associate professor and in 2009 he was promoted as Professor. In 2017 he was assigned duty of Zonal Director Research of Agricultural Research Station, Bikaner. He got Meghavi student certificate from Abhinav Pragati Samiti, Baggar, , Sainik board scholarship during matriculation and graduation, JRF(ICAR) during Post graduation. He felicitated Chaudhary Devi Lal AICRP Team Research Award 1999 – 2000, Krishi Seva Ratan Award 2007 from National Patrikas Harit Kranti, Jaipur, Outstanding Partnership Awards by ICRISAT in HOPE Project and Best worker award by Hon'ble Vice Chancellor of SKRAU, Bikaner. He handled more than 8 projects as PI and Co-PI. Dr Shekhawat also worked as Experts in UPPSC and Departmental selections of many institutions. Currently he is the member of Board of Management and Academic council of SKRAU, Bikaner. Dr Shekhawat had attended more than 40 seminars, symposiums and workshops. He also visited foreign countries like Ethiopia and Kenya to attend global midterm review meeting and planning of HOPE project. He had published more than 38 research papers in reputed journals, 5 books/book chapters, more than 30 popular articles in Hindi as well as in English, and guided 5 Ph.D and 10 M.Sc. students as a major advisor. He is a life time member of several scientific societies and convener of many internal committees of SKRAU, Bikaner. Dr Shekhawat had developed 28 crop production and management technologies and two pearl millet varieties during his carrier. Presently, Dr. Shekhawat is serving as Director Research, SK Rajasthan Agricultural University, Bikaner.

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