

AGRI STARTUPS FOR SMART FARMING

Agri Startups are in the take-off stage in Indian farming. Pertaining to several activities such as weather advisories, modified farming including irrigation, introduction of new crops, seed production, spatial technologies, remote operation techniques, drones and sensors, precision farming and protected cultivation with high value crops, bioformulations, harvest implements, aggregation, primary processing, sorting and grading, packaging, delivery and logistics, waste management, etc., their efforts have been focused towards enhancing efficiency in farm operations and maximizing returns. Elements of novelty, quality, innovation and entrepreneurship being the key ingredients, some of the units have brought in new approaches in this context, such as apps, image processing, nanotechnologies, artificial intelligence, branding and so on.

This book will provide a single platform on the topic related to agri startups. It covers the concepts and terms related to startups, technology profiling and support for incubators and start ups, capacity building and skill development needs, financial instruments and institutional mechanisms and market orientation of start ups etc. This book shall serve the purpose for academia sector especially for startups, entrepreneurs, students, teachers, and research scholars in the field of agriculture and allied sciences. The book is well referenced, making skillful use of first-person sources. The authors place on record to acknowledge the various sources of references from where this book is compiled.



International Books and Periodicals Supply Service

38 Nishant Kunj, Main Road Pitampura, Delhi-110 034 (India)

Phone No. 011 - 27352078, 9810146811

e-mail : hkjain1975@yahoo.com

Exclusive Distributed by :

Satish Serial Publishing House, Delhi-110 033



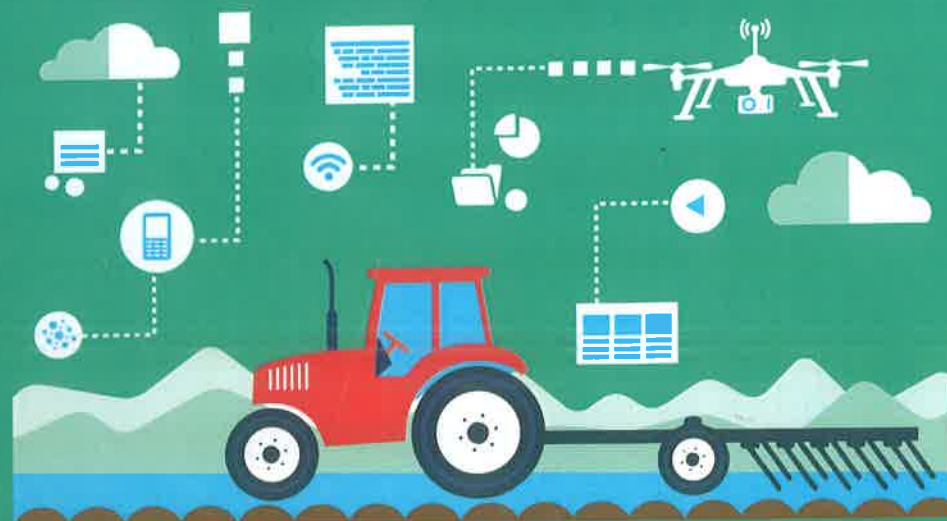
Rs. 1890.00

AGRI STARTUPS FOR
SMART FARMING

S. Ayyappan
Mukund A. Kataktaalware
Letha Devi G.



AGRI STARTUPS FOR SMART FARMING



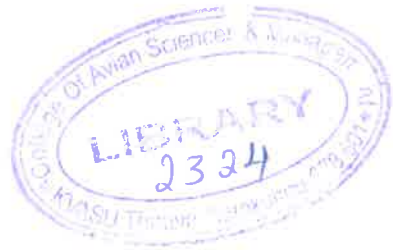
S. Ayyappan

Mukund A. Kataktaalware

Letha Devi G.



2324

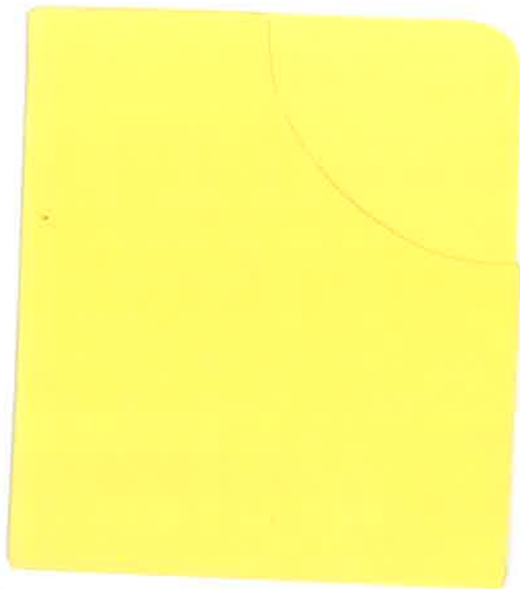


**COLLEGE OF AVIAN SCIENCES & MANAGEMENT
KVASU CAMPUS, THIRUVAZHAMKUNNU**

Acc. No. 2324.....

Call No.....

**This book should be returned on or before the
date last given below.**



--	--	--

Agri Startups for Smart Farming

Agri Startups for Smart Farming

S. Ayyappan
Mukund A. Katakware
Letha Devi G.



International Books & Periodical Supply Service

(Publisher of Scientific Books)

38, NISHANT KUNJ, PITAM PURA MAIN ROAD
DELHI-110034 (India)

Phone : 011-27352078, Mobile : 09810146811, E-mail : hkjain1975@yahoo.com

Published by :

International Books & Periodical Supply Service

(Publisher of Scientific Books)

38, NISHANT KUNJ, PITAM PURA MAIN ROAD

DELHI-110034 (India)

Phone : 011-27352078, Mobile : 09810146811, E-mail : hkjain1975@yahoo.com

© **Publisher**

ISBN 978-93-88892-01-8

© 2019. All rights reserved, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher and also the copyright rights of the printing, publishing, e-book of this edition and subsequent editions will vest with the publisher. All Computer floppies, CD's, e-book and in any other form relating to this book will be exclusive property of the publisher.

This book contains information obtained from authentic and highly regarded sources. Reasonable efforts have been made to publish reliable data and information, but the publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The publisher have attempted to trace and acknowledge the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission and acknowledgements to publish in this form have not been obtained. If any copyright material has not been acknowledged please write and let us know so that we may rectify it.

Composed, Designed & Printed in India

Preface

Agriculture in India is a way of life. Along with multiple dimensions of food production systems, it has impacted livelihoods as well as other segments of economy. In fact, the reference points for the Indian financial management are the arrival of the annual monsoon as well as the market arrivals. Technologies and practices are transforming every sphere of economy like never before. Similarly, farming is getting impacted by the changing business approaches. Efficient agriculture and speciality agriculture with market connectivity are the new dimensions being discussed and incorporated. The paradigm shift required from production agriculture to secondary agriculture for remunerative agriculture has by now been fully appreciated.

In the 'seed-to-market' approach for profitable agriculture, innovations are the key to reduce efficiency losses at various levels. Shift from subsistence farming to enterprise, agriculture is the future of food production systems. It involves both technical as well as entrepreneurial inputs to make farming 'smart'. The concepts of agri-incubators and startups are finding their roots in the recent past, with partners from all over, even outside agriculture. These have brought in new ways of thinking and conducting farm operations, both on farm and off farm. These also require resource assessment, strategic planning, skill development, risk assessment, communication and management as well as financial and policy environment.

It is in this context a National Consultation on 'Agri Startups for Smart Farming' was organized to analyse the functioning of the incubators and start ups, discuss the high points and constraints, and plan a way forward in terms of finance and policy imperatives in the context of emerging secondary and corporate agriculture. We are grateful to Dr H K Bhanwala, Chairman, NABARD, Mumbai; Dr H R Dave, Deputy Managing Director, NABARD, Mumbai; Dr U S Saha, MD, NABFINS; Dr P V S Surya Kumar, Chief General Manager, NABARD, Bengaluru; Dr Raghavendra Bhatta, Director, ICAR-NIANP, Bengaluru; Dr M J Chandre Gowda, Director, ICAR-ATARI, Bengaluru and Dr K P Ramesha, Head, ICAR- NDRI SRS, Bengaluru; for the guidance and facilitation for the organization of National Consultation. Special gratitude is placed on record to TATA TRUSTS and Social Alpha, for their kind support and co-operation. Contributions of team of convenors; Dr M C A Devi, Dr S Subhash, Dr P K Dixit, Dr M H Sathish Kumar, Dr B Srinivas, Dr S Anandan,

Dr N K S Gowda, Dr S Senani, Dr Menon Rekha Ravindra, Dr Atul Kolte, Dr P K Malik, Dr K Giridhar, Dr P Heartwin Amaladhas, Dr F Magdaline Eljeeva Emerald, Dr A Arangasamy, Dr M Sivaram, Dr K Binsila and Dr K Jayaraja Rao are gratefully acknowledged. Assistance rendered by Ms Kavyashree, M C, Ms K P Anjana, Dr Niketha L and Mr Manoj M is deeply appreciated. Thanks are due to all the authors for enriching this publication with their intellectual inputs. We are sure, this book will bring greater clarity for making 'beyond farm' approach an integrated component of successful agriculture in India and startups make farming a 'win-win-win' for producers, consumers as well as themselves.

16 February, 2019

Editors

About the Editors

S. Ayyappan has significantly contributed to the R&D of fisheries sector in particular and agriculture in general. He has served the country in different roles of Director, ICAR-CIFE, Mumbai; DDG (Fisheries), ICAR, New Delhi and Secretary, DARE and Director General, ICAR before joining as the NABARD Chair Professor at ICAR-NDRI, SRS, Bengaluru. His scientific contributions towards the development of agriculture are well appreciated and he has been bestowed with several recognitions and awards. Dr. Ayyappan is presently serving as Chancellor to Central Agricultural University, Imphal.

Mukund A. Kataktaaware did his graduation in Veterinary Sciences and Animal Husbandry from Veterinary College, Nagpur in 1997. He completed her Master's and Doctoral degree in Livestock Production and Management from National Dairy Research Institute in 2001 and 2004, respectively. Dr. Kataktaaware joined Indian Council of Agricultural Research as a scientist in 2004 at National Research Centre on Yaks, Dirang, Arunachal Pradesh, where he served for about five years. Presently Dr. Kataktaaware is working as a Senior Scientist under ICAR-National Dairy Research Institute, Southern Regional Station, Bengaluru. He later did his PG Diploma in Intellectual Property Rights from IGNOU, New Delhi in 2013. He has published a number of research papers and popular articles in various national and international journals of repute. He has published a book on Scientific Dairy Farming and successfully guided several PG students for their research work.

Letha Devi G. did her graduation in Agriculture from Kerala Agricultural University in 2001 and topped the university. She completed her Master's in Dairy Extension from National Dairy Research Institute in 2004 with Director's Gold Medal. She completed her doctoral degree from Indian Agricultural Research Institute, New Delhi in the discipline of Agricultural Extension in the year 2007. She joined Indian Council of Agricultural Research as a Scientist in 2007. She is working as a Scientist under ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru. She did PG Diploma in Intellectual Property Rights from IGNOU, New Delhi in 2013. She has published a number of research papers and popular articles in various national and international journals of repute.

Contents

<i>Preface</i>	<i>v</i>
1. Technology Backstopping to Promote Startups Ecosystem in India - A Case Study	1
<i>Razia Mohammed A., George Ninan and Ravishankar C.N.</i>	
2. Technology Profiling and Support for Incubators and Startups.....	11
<i>C. Anandharamakrishnan</i>	
3. Customer-Centric “Lean-Agri Startups” for Smart Farming.....	25
<i>V.G. Dhanakumar</i>	
4. Strategies for Agri Startups Initiative for Small Farmers	39
<i>S. Prabhu Kumar</i>	
5. Potential of Startups in the Domain of Agricultural Research and Testing	51
<i>Pitam Chandra</i>	
6. Strategies for Market Orientation of Agri Startups for Smart Farming	61
<i>P. Adhiguru and G. Letha Devi</i>	
7. Capacity Development and Skill Development Needs of Agri Startups	73
<i>Bharat S. Sontakki and R. Praveen Kumar</i>	
8. Techno Economic Viability of Agri Businesses	87
<i>Divya Rajput</i>	
9. Agriculture 4.0: The Future of Farming and Agri-Tech.....	93
<i>Sivakumar and S. Suresh</i>	

10. Role of Agri-Business Incubation Centres of Research Institutions in Promoting Startups 109
Sudha Mysore
11. Opportunities for Agri Startups in Genomics and Plant Molecular Biology 119
Santosh R.S., Siby Varghese, Shelba Mariam Skariah and Basil Kuriokose
12. Untold Complex Constrains in the Startups for Bio-fuel Promotion - A Live Experience 131
K. Narayana Gowda
13. Opportunities and Challenges for Agri-entrepreneurships in Promotion of Biological Control for Crop and Soil Health - A Case Study with Entomopathogenic Nematodes 143
M. Nagesh, Letha Devi G. and Chandish R. Ballal

Chapter 1

Technology Backstopping to Promote Startups Ecosystem in India - A Case Study

Razia Mohammed A., George Ninan, Ravishankar C.N.

ICAR - Central Institute of Fisheries Technology, Cochin, Kerala
E-mail: cnrs2000@gmail.com

India is fast emerging as a startup nation and technology landscape has witnessed a tremendous growth towards creation of innovative startups and has emerged as the 3rd fastest growing hub for technology startups in the country. As per the NASSCOM startup report, 2018, India has gained the position as a global startup hub that is becoming attractive for investors, startups and corporates. Innovative and novel technologies are increasingly recognized as one of the crucial factors to enhance the business' competitiveness and gain success in the global market-driven economy.

With the aim of enhancing the foundation for new technology based industries and developing a knowledge-based economy, particularly in the fisheries sector, ICAR-Central Institute of Fisheries Technology (ICAR-CIFT) started an Agri-Business Incubation (ABI) Centre. This entrepreneurial support system handholds entrepreneurs to shift their economic resources through strong technical and advisory support, into areas that yield higher productivity and returns. It focuses on finding new ways of doing business in fisheries and allied agricultural fields, through wide spectrum of activities. The Centre helps prospective entrepreneurs, by providing pro-active and value-added business support in terms of technology transfer, consultancy, infrastructure facility, experts' guidance and specialized training programmes to develop technology-based business ideas and establish sustainable enterprises. It acts as a platform for the speedy commercialization of the technologies, through an interfacing and networking mechanism between research institutions, industries and financial institutions. The incubator at ICAR-CIFT differs from traditional Business Incubators as it is tailored specifically for