# Principles of Organic Farming:

## Textbook

(As per Syllabus of 5th Dean's Committee, ICAR)

— *P. L. Maliwal* —

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# FOREWORD

Increasing awareness about environmental pollution, deteoriating soil productivity and health hazards associated with indiscriminate use of fertilizers and pesticides and consumers preference for safe and quality food are the major factors that lead to growing interest in alternate forms of agriculture in the world. Organic farming is the production system gaining importance world over as it is eco-friendly and safe to human health. The demand for organic food is steadily increasing both in developed and developing countries with an annual average growth rate of 20-25%.

Organic farming is a holistic system designed to optimize and fitness of diverse communities within the agro-ecosystem, including soil microorganisms, plants, livestock and people. Presently organic farming is being practiced in 181 countries with the organic area of 69.8 million hectares. In India the area under organic farming is 3.429 million hectares, which includes certified cultivated area and wild certified area during 2018-19. The registered organic farmers in the country are highest in the world. The growth of organic farming is around 12-15% in India.

The author presented the book entitled "Principles of Organic Farming: Textbook" which is a scientific and systematic collection of text in a cogent and easily understandable manner. The book is written to fulfill the basic requirement of under graduate students of agriculture stream considering the syllabus recommended by 5$^{th}$ Dean's Committee of 1CAR.

I hope that this book will serve as text book for under graduate students of agriculture. I understand that this will also be of equal significance for university teachers and extension personnel's dealing in organic farming. I congratulate Dr. P. L. Maliwal for his painstaking efforts in bringing out this book covering the latest innovations in the field of organic farming under the ICAR- Emeritus Professor Scheme.

I am confident that this book will be widely accepted among the students. I extend my best wishes to Dr. Maliwal for success of this book.

(N.S. Rathore)

# Preface

Organic agriculture is defined worldwide as "***farming without the addition of artificial chemicals***". Organic farming is widely practiced in under developed and developing countries, largely because of the fact that the farmers are unable to afford costly inorganic inputs. However, in developed countries people are concern about environmental safety and sustainability of land productivity and health hazards, which encouraged organic farming in these countries. The strategies evolved during green revolution era cannot be valid any more under the prevailing conditions. A new strategy of living with nature and nurturing it for sustainable high productivity should be evolved and organic agriculture showed the way to effectively use the available natural resources for the benefit of mankind without polluting the environment.

A large number of books are available on organic farming but most of them are much elaborated and it is very difficult for the students, teachers to screen the material as per their requirement. Therefore, efforts have been made to compile and consolidate the information available on organic farming and presented in a cogent, clear and simple language. The book is written basically to fulfill the requirement of under graduate students of agriculture stream considering the syllabus of 5$^{th}$ Dean's Committee of ICAR. The author is optimistic that the students community will harness the benefit of this book in understanding the subject of organic farming.

The author is deeply indebted to Indian Council of Agricultural Research, New Delhi for providing opportunity for preparing the manuscript under the Emeritus Professor Scheme of ICAR.

The author acknowledge his indebtness to authors of books and other publications from which most of the material/literature have been drawn. In several cases, it has not been possible to obtain permission for reproduction, for which the authors and publishers offer their apologies.

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I am also thankful to Dr S.K. Sharma, Zonal Director Research, Dr S.L. Mundra, Director Extension Education, MPUAT, Udaipur, and other faculty members of Department of Agronomy, Rajasthan College of Agriculture, Udaipur for the help and suggestions rendered for betterment of this book.

The author also welcome constructive comments and suggestions from the readers whosoever for further improvement of the book and that would be duly acknowledged. I sincerely thank to the Scientific Publishers, Jodhpur for publishing this book well in time.

**P.L. MALIWAL**

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Chapter

1

# An Introduction to Organic Farming

In the view of increasing consumption of fertilizers and insecticides, deteriorating soil health and pollution of air, water, and food, there is a growing concern about global environment and so the concept of organic farming is gaining importance world over in order to develop sustainable and eco-friendly agricultural production system. Organic farming is primarily based on the principles of use of natural onfarm organic inputs like farmyard manure (FYM), compost, green manures, oil cakes, press mud, etc. besides the natural biological pest control and plant protection measures with minimal use of natural minerals to promote agro-economic system and soil biological activity.

Prior to independence, Indian agriculture was considered to be a gamble of monsoon. There was great uncertainty in food grain production as it was solely dependent on quantum of rainfall and its distribution. In India in $1950^{S}$ and $1960^{S}$ the country faced severe food scarcity and govt. of India was forced to import food grains from other countries. Looking to this peculiar situation in the country, India aimed to boost the food grain production drastically. Under the stalwart leadership of Dr. M.S. Swaminathan the green revolution programme was launched by the Government of India in $1960^{S}$, in which major emphasis was given on improved crop varieties and use of fertilizers and pesticides. Indian farmers adopted these practices and shifted from organic based farming to chemical based inorganic farming, so called modern agricultural.

No doubt this has revolutionized agriculture in the country and led to substantial increase in food grain production in few years and the country has become self sufficient in this respect. But latter it has been realized that the increase in

food grain production was achieved at the cost of deteriorated soil health, environmental pollution and health hazards, which costed us dearly. This has led to think about organic farming, which required total elimination of the fertilizers and pesticides/ chemicals in agriculture. It is high time to rethink that we should switch on to chemical less agriculture or maintain a balance between the two to get required food grain production vis-a-vis protect the soil, environment and health of the people, which is of foremost importance in future. The aim of the organic farming is to protect the environment as well as natural resources (land, water and plants) and produce safe and healthy food.

Organic farming is a holistic system designed to optimize the productivity and fitness of diverse communities within the agro-ecosystem, including soil organisms, plants, livestock and people. The principal goal of organic production is to develop enterprises that are sustainable and harmonious with the environment. Organic farming promotes the use of crop rotations and cover crops, and encourages balanced host/predator relationships. Organic residues and nutrients produced on the farm are recycled back to the soil. This system merits consideration on the ground that most of the ill effects of modern day agriculture are avoided. Use of agrochemical is forbidden. There is emphasis on build up of organic matter in the soil, thereby activating biological activity. Soil is treated as a living organism. Maintenance of favourable soil structure and use of crop rotation that improves soil fertility, control insect pests, and diseases, and weeds through organic means only and get nutritious healthy food.

The modern concept of organic farming combines the tradition, innovation and science. Although, history states that the movement for organic way of life recognized in 1905, it could gain ground after realizing the ill effects of modern agriculture in the late 1990's. In 1905, the British botanist Sir Albert Howard often referred to as the father of modern organic agriculture, documents traditional Indian farming practices, and came to regard them as superior to conventional agriculture science. During 1940, in Japan, Masanobu Fukuoka, a microbiologist working in soil science and plant pathology, quit the job as a research scientist, returned to his