

Entrepreneur India

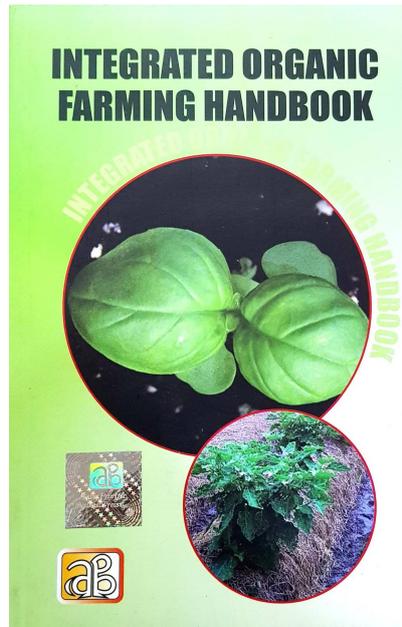
106-E, Kamla Nagar, New Delhi-110007, India.

Tel: 91-11-23843955, +91 9097075054

Mobile: +91-9097075054

Email: npcs.ei@gmail.com, info@entrepreneurindia.co

Website: www.entrepreneurIndia.co



Integrated Organic Farming Handbook

| | |
|---------------------|----------------------------------|
| Code | NI248 |
| Format | paperback |
| Indian Price | ₹1275 |
| US Price | \$33.95 |
| Pages | 472 |
| ISBN | 9788178331522 |
| Publisher | Asia Pacific Business Press Inc. |

Description

Organic agriculture has grown out of the conscious efforts by inspired people to create the best possible relationship between the earth and men. After almost a century of

neglect, organic agriculture is now finding place in the mainstream of development and shows great promise commercially, socially and environmentally. Integrated organic farming is a commonly and broadly used word to explain a more integrated approach to farming as compared to existing monoculture approaches. It refers to agricultural systems that integrate livestock and crop production and may sometimes be known as Integrated Bio systems. It denotes a holistic system of farming which optimizes productivity in a sustainable manner through creation of interdependent agri-eco systems where annual crop plants (e.g. wheat), perennial trees (e.g. horticulture) and animals (including fishes where relevant) are integrated on a given field or property .This concept of organic farming is based on following principles: 1. Nature is the best role model for farming, since it does not use any inputs nor demand unreasonable quantities of water.2. The entire system is based on intimate understanding of nature's ways of replenishment. The system does not believe in mining of the soil of its nutrients and do not degrade it in any way. 3. The soil in this system is considered as a living entity 4. The soil's living population of microbes and other organisms are significant contributors to its fertility on a sustained basis and must be protected and nurtured, at all cost. 5. The total environment of the soil, from soil structure to soil cover is more important and must be preserved.

Integrated Organic farming is a method of farming system, which primarily aims at cultivating the land and raising crops in such a way, so as to keep the soil alive and in good health. It is the use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials, mostly produced insitu- along with beneficial microbes (bio fertilizers) to release nutrients to crops, which connotes the 'organic' nature of organic farming. It is also termed as organic agriculture. In the Indian context it is also termed as 'Javik Krishi'. We have compiled all the relevant information regarding integrated organic farming in this book. This is first book of its kind which contains reliable details related to organic farming, green manuring, biological nitrogen fixation, uses of vermiculture bio-tech, organic fertilizers for flooded rice ecosystem, biological pest management, press mud as plant growth promoters, bio fertilizer for multipurpose tree species, rice- fish integration, response of crops to organic fertilizer and many more.

The book is very useful for farmers, agriculture, universities, consultants and research scholars.

Content

- 1. NECESSITY OF ORGANIC FARMING
- Management of Autonomous Ecosystem
- Mixed Farming
- Plants

Animals
Soils
Biosphere
Crop Rotation
Benefits of Crop Diversification
Organic Cycle Optimization
In Partnership with Nature
Basic Standards and General Principles for Organic Agriculture
Crop and Soil Management
Choice of Crops and Varieties
Crop Rotations
Fertilization Policy
Management of Pests, Diseases and Weeds
Wild Products
Pollution Control
Soil and Water Conservation
Landscape
Principle Requirements and Pre-conditions
Conversion from Conventional to Organic Farming
Farms with Plant Production and Livestock
Limitations
Initiating Organic Farming
Medicinal Plants-the First Crops for Organic Farming
Management of Permaculture Farm
Permaculture Farm
Use of Draft Animal
Making Permanent Farm
Conservation of Soil
Protection of the Soil against Fires
Protection form Water Erosion
Protection from Wind Erosion
Improvement of the Soil
How to Bury Organic Matter
Mixed Cropping
Permaculture for Wastelands
Soil and Water Conservation
Pioneers
Pioneer Trees and Plants
Secondary Species
Conclusion

2. GREEN MANURING—A BASIC COMPONENT OF

ORGANIC FARMING

Definition

Objectives of Green Manuring

Subsidiary Objective of Green Manures

Catch Crops

Shade Crops

Cover Crops

Forage Crops

Advantages of Green Manuring

Soil Structure and Tilt Improvement

Fertility Improvement of Soils

Amelioration of Soil Problems

Improvement in Crop Yield and Quality

Pest Control

Classification of Green Manures

Legumes

Non-Legumes

Characteristics Desirable in Legume Green Manure Crops

Leguminous Green Manures

Non-Conventional Green Manures

Other Green Manures

Choice of Green Manure Species

Forms of Green Manuring

Agronomy of Green Manure Crops

Sesbania Speciosa

Sesbania Aculeata {Dhaincha}

Sesbania Rostrata

Crotalaria Juncea (Sunnhemp)

Tephrosia Purpurea (Wild Indigo)

Indigofera Tinctoria

Calapogonium Mucunoides

Phaseolus Trilobus (Phillipesara)

Centrosema Pubescens

Macroptilium Atropurpureum (Siratoo)

Stylosanthes Hamata

Pueraria Phaseoloides (Kudzu)

Dolichos Lab Lab var. *Lignosus*

Agronomy of Green Leaf Manure Shrubs and Trees

Glyricidia (*Glyricidia Maculata* Syn. *G. sepium*)

Ipomoea Cornea

Cassia Auriculata

Derris Indica (Syn. Pongamia Glabra)
Azadirachta Indica (Neem)
Thespesia Populnea
Rhizobial Inoculation
Conditions for Fixation of Nitrogen
Bacterial Inoculation of Legumes
Stage of Incorporation
Time of Incorporation
Method of Application of Green Manure
Decomposition of Green Manure
Aerobic Decomposition
Changes in the Carbon Compounds
Changes in Nitrogen Compounds
Changes in the Mineral Constituents
Anaerobic Decomposition
Carbon Nitrogen Ratio on Decomposition Process
Farmer Acceptance of Green Manuring
Limitations in Raising Green Manure Crops
Conclusions
Future Needs

3. BIOLOGICAL NITROGEN FIXATION

Definition
Symbiotic and Non-Leguminous Symbiotic System
Azotobacter
Beijerinckia
Azospirillum
Application
Other Bacteria
Blue Green Algae
Multiplication
Trough Method
Pit Method
Field Method for Large Scale Production
Limitations
Azolla
Nursery
Azolla Application Methods
Green Manuring
As Dual Crop
Efficiency of Azolla
Limitations

Frankia
Legume-Rhizobium Symbiosis
Methods of Application
Seed Inoculation
Pelleting
Other Symbiotic Nitrogen Fixing Systems
Other Bioinoculants
Phosphate Solubilising Microorganisms (PSM)
Vesicular Arbuscular Mycorrhiza (VAM)
Inoculation Methods
Transplanted Crops
Direct Sown Crops
Seed Coating
Pelleting
Fluid Drilling
Furrow Inoculation
Precropping
Plant Growth Promoting Rhizobia (PGPR)
Conclusion
Future Needs

4. APPLICATION OF VERMICULTURE BIOTECHNOLOGY

Vermiculture Biotechnology
Earthworm for Nutrient Management
Effect on Soil Fertility
Nitrogen
Phosphorus
Potassium
Earthworms for Water Management
Earthworm Castings
Earthworms Act as Biopump
Earthworms for Effective Waste Management
Composting of Municipal and Industrial Wastes
Earthworms for Disease and Pest Management
Earthworms for Nutritional Crops
Earthworms for Sustainable Agriculture and Wasteland Development
Earthworms as Vectors of Beneficial Microorganisms
Successful Applications
Harnessing Vermiculture Biotechnology
Selection of Proper Species
Use of Vermicastings for Inoculation

Earthworms and Land Use Practices
Effect of Organic Manure and NPK Fertilizers on Earthworm Activity
Cultivation
Mulching
Irrigation
Biocides
Procedure to Prepare Vermicompost
Culturing Technique
Culture Bed
Feed Composition
Feed Application
Wormcast Production and Collection
Application of Vermicompost
Conclusion
Future Research Needs

5. ORGANIC FERTILIZERS FOR FLOODED RICE ECOSYSTEM

Azolla
Growth and N-Fixation
Factors Affecting Growth and N-Fixation
Management Practices
Impact on Rice Yield and Soil Fertility
Economic Aspects
Suitable Agroclimatic Conditions
Adoption Constraints and Future Research Needs
Blue-Green Algae (BGA)
Nitrogen Fixing Potential and N-input
Factors Affecting Growth and N-fixation
Management Practices
Impact on Rice Yield and Soil Fertility
Economic Aspects
Suitable Agroclimatic Conditions
Adoption Constraints and Future Research Needs
Conclusions

6. PHOSPHATE SOLUBILIZING MICROORGANISMS : FUNGI AND BACTERIA

Problems in Phosphorus Uptake
Phosphate Fixation in Different Soils
Historical Developments
Phosphate Solubilization
Factors Affecting Phosphate Solubilization

Isolation

Mechanisms of Action

Role of Acids

Other Mechanisms

Effect on Crop Yield

7. PHOSPHATE SOLUBILIZING MICROORGANISMS :

MYCORRHIZAE

Mycorrhizal Types and Their Structural and Nutritional Features

Ectomycorrhizae

Mechanism of ECM Formation

Morphology and Structure

Synthesis of Mycorrhiza

Cultural Study

Vesicular Arbuscular Mycorrhiza

Introduction

Evolution

Taxonomy

Classification

Distribution

Lifecycle

Reproduction

Sexual Reproduction

Asexual Reproduction

Method of Inoculum Production of VAM

Some Important Steps in Production of VAM

Host Plant/Growth Medium

Fertilizations/Micronutrients

Chemical Application

Control of Fungal Pathogens

Plant-Vesicular Arbuscular Mycorrhizal Fungal Interactions

Vam and Soil Biota

Control of Root Diseases

Endomycorrhiza and Plant Disease

Ectomycorrhizal Fungi and Tree Diseases

Mechanism of Disease Control

Outlook

8. APPLICATION AND EVALUATION

Different Methods for Biofertilizer Inoculation

Seed Inoculation

Top Dressing of Biofertilizers

Granular Biofertilizers

Solarisation of FYM/Compost
Granular Biofertilizer Mixed with Seed
Broadcasting of Granular Biofertilizers
Frequency of Inoculation
Liquid Inoculation of Biofertilizers
Methods of Application of Liquid Inoculation
Drenching By Sprayers
Application in Root Zone
Culture Pellet
Methods of Application of Other Biofertilizers
Blue Green Algae
Azolla
As Green Manuring
Azolla Dual Cropping
Azotobacter
Preparation and Use of Azotobacter Inoculant
Application
Azospirillum
Mycorrhizae
Endomycorrhizae
Ectomycorrhizae
Techniques for Isolation of Vesicular Arbuscular Mycorrhizal Fungi (VAMF) from Soil in Laboratory
Gerdemann and Nicolson Technique
Sutton and Barron Flotation Technique
Method for Examination of Mycorrhizal Infection in Root Samples
Foliar Biofertilizer
Humar
Humic Acid
Introduction
Application
Soil
Foliar
Seed Treatment
Soil Benefit
Root
Seeds
Plants
Precautions
Different Media Used to Study Biofertilizer
I. Growth Media for Rhizobium

Media for Testing Nodulating Ability of Rhizobium

Jenson's Plant Nutrient

II. Isolation Of Frankia

III. Selective Media For Blue Green Algae

IV. Selective MEDIA For Azotobacter

V. Selective Media for Azospirillum

VI. Selective Media for Phosphate solubilizing organisms

VII. Selective Medium for isolation of Pseudomonas fluorescens, a biocontrol agent (Subba Rao, 1986).

VIII. Selective medium for isolation of Trichoderma - an antagonistic fungus.

9. BIOLOGICAL PEST MANAGEMENT

Cultural Control

Sanitation

Tillage

Application of Manures and Soil Amendments

Habitat Diversification

Crop Rotation

Trap Cropping

Intercropping

Strip Farming

Time of Planting

Water Management

Crop Competition

Physical and Mechanical Control

Manual Control

Burning

Solarization

Flooding

Biological Control

Conservation of Biodiversity

Conservation of Natural Enemies

Biopesticides

Botanicals

Host Resistance

Increasing the Effectiveness of Bio-control

Autocidal Control

Bheavioural Control

Pheromones

Fairomones

Success Rate of Ecological Management

Other Related Approach

Integrated Pest Management
Biologically Intensive Pest Control (BIPM)
Success with Biological Control
Rice
Sugarcane
Tomato
Tobacco
Cotton
Horticultural and Plantation Crops
Future Thrust
Conclusions

10. PRESSMUD AS PLANT GROWTH PROMOTER
Material and Methods
Results and Discussion

11. BIOFERTILIZER FOR MULTIPURPOSE TREE SPECIES
Material and Methods
Species
Inoculum Preparation
Treatment
Preparation of Soil-Vermiculite Mixture
Inoculation of Acacia Nilotica
Inoculation of Eucalyptus Hybrid
Results
Discussion
Summary

12. TREE LEGUMES TO BIOINOCULATION OF ENDOMYCORRHIZAE
Material and Methods
Results and Discussion
Summary

13. GROWTH RESPONSE OF CAJANUS CAJAN
Material and Methods
Growth Response of Cajanus Cajan to Glomus Aggregatum with Cement Dust Amendments
Assessment of Percent Mycorrhizal Association
Estimation of Dry Weight
Results
Infectivity
Efficacy
Discussion

Summary

14. SALINE SOIL TOLERANCE OF SAPINDUS EMARGINATUS

Material and Methods

Results and Discussion

15. SELF SUSTAINABILITY OF ORGANIC FARMING

Self Sustainable System

Design of Self-Sustainable Agro-Ecosystems

Ecological Processes to Optimize in Agro-Ecosystems

Mechanisms to Improve Agro-Ecosystem Immunity

Peripherals for Self-Sustainability

Bio-Diversified Agro-Ecosystems

Crop Rotations

Polycultures

Agroforestry Systems

Cover Crops

Animal Integration

Integration of Livestock

Integration of Aquaculture

Indigenous Organic Farming Practices

Soil and Water Conservation

Arable Land Management

Agronomical Measures

Wind Erosion Control

Water Erosion Control Measures

Engineering Measures

Non-Arable and Denuded Land Management

Rain Water Conservation

Mulches

Essentiality of Mulching

Mulch and Microlife Activities

Activity of Earthworm

Weed Suppression

Birds and Mulch Disturbance

Mulch and Retention of Moisture

Increase in Crop Yield

Control of Temperature

Protection Soil Against Erosion

Control of Pest and Disease

Appearance

Drawbacks of Mulching

Types of Mulch
Loose Organic and Non Organic Mulches
Vertical Mulch
Live Vegetative Barriers
Agroforestry/Alternate Land Use Systems
Basic Principles
Types of Agroforestry Systems
Alley farming
Ley farming
Silvipasture
Agri-Horticulture
Windbreaks and Shelterbelts
Interactions Between Trees and Crops
Useful for Organic Farming
Effects of Trees on Soils
Beneficial Effect
Soil Conservation
Soil Fertility
Management of Adverse Effects of Trees
Management of Agroforestry for Organic Farming
Conclusion

16. RICE ECOSYSTEM
Rice Ecosystems of Kerala
Midland and Malayoram Rice Ecosystem
Chittoor Black Soil
Irrigated Rice Ecosystem
Onattukara
Kuttanad
Karilands
Karappadam Soils
Kayal Lands
Kole Lands
The Coastal Saline Rice Eco Systems
High Range Rice Eco System
Koottumundakan System

17. "POKKALI"—WORLD ACCLAIMED FARMING
SYSTEM MODEL
Climate
Crops and Crop Season
Reclamation of Saline Soils
Varieties

Seeds and Sowing
Seedling Establishment and Aftercare
Rice-fish/prawn integration in Pokkali fields
Selective Culture of Prawn
Rice Cum Fish Culture
Sustainable Farming System
18. NEEM : THE BEST EXAMPLE FOR ORGANIC FARMING
Uses of Neem
Neem for Pest Control
Limonoids
Azadirachtin
Meliantriol
Salannin
Nimbin and Nimbidin
Others
Mode of Action
Effectiveness
Good Control
Moderate Control
Poor Control
Nontarget Species
Earthworms
Beneficial Insects
Preparations for Pest Control
Methods of Application
Water Extraction
Hexane Extraction
Pentane Extraction
Alcohol Extraction
Formulations
Additives
Practical Methods for Preparations
Control of Stored Grain Pest
Uses of Neem Extract
Preparing Crushed Neem Seed
Neem to Control Stem Borers on Young Plants
Extracting Neem Oil
Controlling Bruchid Beetles in Stored Beans
Control of Soil-Borne Pests
Neem Water Extract for Plant Protection

Water based Neem Spray to Control Cutworms

Success Stories

Desert Locust

Cockroach

Brown Planthopper

Stored-Product Insects

Armyworm

Mosquitoes

Aphids

Fruit Flies

Nematodes

Snails

Crustaceans

Fungi

Aflatoxin

Plant Viruses

Propagation and Planting of Neem

Climatic Requirements

Rainfall

Temperature

Raising Seedlings

Transplanting

Conclusions

19. RICE-FISH INTEGRATION : A WIN-WIN FARMING MODEL

Externalities of Green Revolution

Lowland Rice Ecologies

Diversification—IFS Approaches

Vanishing Rice Lands—Economic Sustainability Issues

Pokkali System-the Classic Example

Rice-Fish, Harnessing Complementarities

Group Fish Farming (GFF)

Environmental Superiority

Economic Sustainability

Win-Win Land Use Model

20. RICE SOILS IN COASTAL—AREA SUSTAINABLE SOIL NUTRIENT IN ORGANIC RICE FARMING

Organic Farming—the Truths vs. Myths

Organics as a Source of Plant Nutrients

Organic Farming and Food Security

Organic Farming—A Lesson from China

Biodynamic Farming

System of Rice Intensification (SRI)

Conclusions

21. UTILIZATION OF BENEFICIAL MICROORGANISMS FOR SUSTAINABLE ORGANIC RICE PRODUCTION

Biological Nitrogen Fixers

Legume - Rhizobium symbiosis

Azospirillum

Different Methods of Application of Azospirillum in the Field

Cyanobacteria (Blue Green Algae - BGA)

Mass Production of BGA in the Field

Anabaena - Azolla Symbiosis

Utilization of Azolla for Rice

Mass Production of Azolla in the Field

Phosphorus Solubilising Microorganisms

Arbuscular Mucorrhizal Fungi (AMF)

Silicate Solubilising Bacteria

Zinc Solubilising Bacteria

Plant Growth Promoting Rhizobacteria (PGPR)

Efficacy of PGPR in Rice

Methods of Application of Pseudomonas Fluorescens in Rice

Microbial Consortium for Rice

22. BIOGAS POTENTIAL FROM WASTES AND ITS VALUE

Manurial Value of Digested Slurry

23. RECYCLING OF ORGANIC MATERIALS AS ORGANIC FERTILIZERS

Direct Incorporation of Organic Materials in Soil and Their Effects

Maintenance of Organic Matter in Indian Soils

Effect of Organic Matter on Soil Microorganisms

Organic Mulch

Effect of Crop Residues on Yield of Legume Crops

Effect of Straw, Neem Cake and Farmyard Manure on Yield of Maize Crop

Effect of Incorporation of Organic Matter on Paddy Crop

Influence of Humic Substances on Crop Yields

24. RESPONSE OF CROPS TO ORGANIC FERTILIZERS

Farmyard Manure and Compost

Oil-Cakes

Long-Term Effect of Organic Manures

Effect of Organic Manures in Rotation

Manurial Requirements of a Fixed Crop Rotation

Rice-Wheat Rotation
Rice-Rice Rotation
Maize-Wheat Rotation
Jowar-Wheat Rotation
Bajra-Wheat Rotation
Rotation-Jowar in Kharif-Bajra in Rabi
Response of Crops to Bone-Meal

About Niir

NIIR Project Consultancy Services (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. Its various services are: Pre-feasibility study, New Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Preparation of Project Profiles and Pre-Investment and Pre-Feasibility Studies, Market Surveys and Studies, Preparation of Techno-Economic Feasibility Reports, Identification and Selection of Plant and Machinery, Manufacturing Process and/or Equipment required, General Guidance, Technical and Commercial Counseling for setting up new industrial projects and industry. NPCS also publishes various technology books, directories, databases, detailed project reports, market survey reports on various industries and profit making business. Besides being used by manufacturers, industrialists, and entrepreneurs, our publications are also used by Indian and overseas professionals including project engineers, information services bureaus, consultants and consultancy firms as one of the inputs in their research.