# **Integrated Organic Farming Handbook**

Author: Dr. H. Panda Format: Paperback ISBN: 9788178331522

Code: NI248 Pages: 472

**Price: Rs.** 1,275.00 **US\$** 33.95

Publisher: Asia Pacific Business Press Inc.

Usually ships within 5 days

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.

### **Contents**

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 Tilth 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

Cutural 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 Nicolsion 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. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes varies process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

NIIR PROJECT CONSULTANCY SERVICES , 106-E, Kamla Nagar, New Delhi-110007, India. Email: npcs.india@gmail.com Website: NIIR.org

Sat, 27 Jul 2024 15:35:49 +0530