Organic Farming and Biofertilizer Production
Introduction

A Bio fertilizer (also bio-fertilizer) is a substance which contains living microorganisms which, when applied to seeds, plant surfaces, or soil, colonizes the rhizosphere or the interior of the plant and promotes growth by increasing the supply or availability of primary nutrients to the host plant. Bio-fertilizers add nutrients through the natural processes of nitrogen fixation, solubilizing phosphorus, and stimulating plant growth through the synthesis of growth-promoting substances. Bio-fertilizers can be expected to reduce the use of chemical fertilizers and pesticides. Bio-fertilizers provide "eco-friendly" organic agro-input.
Benefits of Bio-fertilizer

• **These are means of fixing the nutrient availability in the soil.**

• **Since a bio-fertilizer is technically living, it can symbiotically associate with plant roots. Involved microorganisms could readily and safely convert complex organic material into simple compounds, so that they are easily taken up by the plants. Microorganism function is in long duration, causing improvement of the soil fertility. It maintains the natural habitat of the soil. It increases crop yield by 20-30%, replaces chemical nitrogen and phosphorus by 25%, and stimulates plant growth. It can also provide protection against drought and some soil-borne diseases.**

• **Bio-fertilizers are cost-effective relative to chemical fertilizers. They have lower manufacturing costs, especially regarding nitrogen and phosphorus use.**
Bio-fertilizers are being essential component of organic farming are the preparations containing live or latent cells of efficient strains of nitrogen fixing, phosphate solubilizing or cellulolytic micro-organisms used for application to seed, soil or composting areas with the objective of increasing number of such micro-organisms and accelerate those microbial processes which augment the availability of nutrients that can be easily assimilated by plants. Biofertilizers play a very significant role in improving soil fertility by fixing atmospheric nitrogen, both, in association with plant roots and without it, solubilise insoluble soil phosphates and produces plant growth substances in the soil.
The increasing demand for the biofertilizers and the awareness among farmers and planters in the use of biofertilizers have paved way for the fertilizer manufactures and new entrepreneurs to get into biofertilizer production. Biofertilizers Demand is much higher than the availability. It is estimated that by 2020, to achieve the targeted production of 321 million tonnes of food grain.

Organic Farming is a method of farming system which primarily aimed at cultivating that land and raising crops in such a way as to keep the soil alive and in good health by use of organic wastes and other biological material along with beneficial microbes (biofertilisers) to release nutrients to crops for increased sustainable production in an eco-friendly, pollution-free environment.
India is an agro based country. So organic farming plays an important role in agro field. The popularity of organic farming is gradually increasing and now organic agriculture is practiced in almost all countries of the world, and its share of agricultural land and farms is growing. As the organic food market continues to expand, so do the opportunities for small farmers.

It is believed by many that organic farming is the much healthier and sustainable option. Although the health benefits of organic food are yet to be proven fully, consumers are willing to pay a higher premium for organic crops. Many farmers in India are shifting to organic farming due to the domestic and international demand for organic food.
Organic foods are produced through systematic farming methods that do not involve any usage of pesticides and harmful chemicals for production. India has around 4.2 Million hectares of land which is certified for organic farming. The emergence of organic farming is also creating a wide array of job opportunities. Increasing awareness towards nutritious and healthy food and changing lifestyle are surging the demand for organic food, particularly across the metro cities.

There is a good chance that India’s organic opportunity could scale from $500 million to about $2 billion — approx $1 billion catering to the domestic market and $1 billion for export markets — by 2020.
This book gives a detailed process on manufacture of biofertilizers & organic farming. It contains chapters on biofertilizers, role of biofertilizer in crop production, production and distribution of biofertilizer, organic farming, method of organic farming, weed and pest management, and many more. This book will be very helpful to soil scientists, microbiologists, biologists, students, new entrepreneurs, fertilizer industry, organization engaged in biofertilizers production, training centres and to all those interested in the efficient use and recycling of wastes, resource management and sustainable farming.
Table of Contents

1. BIOLOGICAL WASTES AS SOURCES OF BIOFERTILIZERS
Significance of Waste Recycling, Chemical Characteristics of Wastes and Utilisation, Hydraulic loading is calculated as follows:, Heavy Metals and Associated Problems, Pathogens and Health Hazards, Effect on Crops Yield and Soil Properties, Effect on Crop Yields, NPK Through Fertilizer, Effect on Soil Properties, Problems in Waste Utilization, Future Research Needs

2. A NOTE ON BIOFERTILIZERS
Rhizobium, Production of Rhizobium Inoculants, Isolation of Rhizobium, Identification of Rhizobium, Establishing the Starter Culture, Mass culture of Rhizobium, Making the Carrier-based Inoculant, Packing and Storage, Field Application of Rhizobium Inoculant, Crop Respons, Azotobacter, Production of Azotobacter Inoculant,
Field Applications, Seed Treatment, Seedling Treatment, Pouring of Slurry, Top Dressing, Beneficial Roles of Azotobacter, Azospirillum, Production of Azospirillum Inoculant, Isolation of Azospirillum, Making the Starter Culture, Mass Culture, Field Use of Azospirillum, Seed Treatment, Seedling Treatment, Top Dressing, Crop Response, Blue - Green Algae (BGA) Biofertilizer, Production of BGA Inoculant, Isolation of BGA, Starter Culture, Mass Culture of BGA, Storage, Field Use of BGA Inoculants, Crop Response, Phosphate Biofertilizers, Isolation of Phosphate Solubilizers, Mass Production, Field Application, Vesicular - Arbuscular Mycorrhizal Fungi, Genera of VAM Fungi, Morphology of VAM, Isolation of VAM spores, Mass Production of VAM, Field Application, Important of VAM Fungi, Field Application of Azolla, Azolla As A Green Manure, Azolla As A Dual Crop
3. ROLE OF BIOFERTILIZER IN CROP PRODUCTION

Nitrogen-fixing Bacterial Inoculants, Rhizobium, Classification, Need for Inoculation, Competitiveness and Effectiveness of Strains, Factors Affecting Performance of Inoculant Strains, Yield Response to Inoculation, Azotobacter and Azospirillum, Yield Responses to Inoculation, Effect of Soil Nutrients, Frequency of Inoculation, Phosphate Solubilizing Microorganisms, Mechanism of Action, Yield Responses to Inoculation, Vesicular-Arbuscular Mycorrhizae (VAM), Mechanism of Action, Root Colonisation, Yield Responses to Inoculation, Preparation of Inoculum, Plant Growth Promoting Rhizobacteria, Mode of Action, Yield Response to Inoculation, Future Research Needs, Strategy for Successful Use of Biofertilizers
4. BIOFERTILIZERS FOR RICE ECOSYSTEM

5. GREEN MANURING

6. PRODUCTION AND DISTRIBUTION OF BIOFERTILIZERS

Definition and Classification, Practical Significance of Biofertilizers, Requirement of Biofertilizers, Production Technology of Biofertilizers, Rhizobium, Sources of Mother Cultures, Carriers, Production of Biofertilizers, Rhizobium, Azospirillum & Azotobacter, Blue Green Algae, Standards and Quality Control, Government Support and Programmes, Constraints, Production and Distribution Level Constraints, Storage and Distribution, Constraints at Field Level, Market Level Constraints, Areas for Future Development, Training, Improvement in production technology, Need for preparation of biofertilizer map, Region-specific effective strains, Necessary quality control acts, Proper storage facilities, Conclusions
7. BIOLOGICAL NITROGEN FIXATION

Non-symbiotic Nitrogen Fixation, Features Favourable for Non-symbiotic Nitrogen Fixation, Special Separation of Nitrogen Fixing Cells, Protein-Nitrogenase Association, High Rate of Respiration, Time Specific Nitrogenase Activity, Association With Rapid Oxygen Consumers, Presence of Hydrogenase, Colonizarion, Nitrogenase, Requirements For Nitrogen Reduction, Assimilation of Ammonia, Nif-genes of Klebsiella Pneumoniae, Regulation of Nif Genes, Nif-genes of Azotobacter, Nif-genes of Anabaena, Rhizobial Genes, Legume Nodulin Genes, Overall Regulation of Genes, Gene Transfer for Nitrogen Fixation, Transfer of Nif genes to Non-nitrogen Fixing Bacteria, Transfer of Nif genes to Plants, Transfer of Nif-genes fo Pfaufs, Transfer of Nod Genes, Transfer of Hup Genes
8. THE SOURCE OF ORGANIC MATTER
The Root-system of Crops, Soil, Algae, Green-manures, Farmyard Manure, Artificial Farmyard Manure

9. THE CHIEF FACTORS IN INDORE PROCESS
10. MANUFACTURE OF BIOFERTILIZER BY THE INDORE METHOD

The Compost Factory, Collection And Storage of the Raw Material, Plant Residues, Urine Earth and Wood Ashes, Water and Air, Arrangement and Disposal of the Bedding under the Work Cattle, Charging the Compost Pits, Turning the Compost, Time-table of Operations, Output, Manurial Value of Indore Compost

11. ORGANIC MATTER AND SOIL FERTILITY

12. WEED MANAGEMENT IN ORGANIC FARMING
13. PEST MANAGEMENT IN ORGANIC FARMING

Pest Management Methods, Biological alternatives, Organically acceptable chemical alternatives, Cultural alternatives, Biological Control, Advantages of Bio-control:, Botanical pesticides, Bacterial insecticides, Viral insecticides, Microbial antibiotics, Biological control in field crops, Other Crops, Botanics for Storage Pest Control, Seed treatment with materials of plant origin for insect control, Active principles, Cultural Practices/Ecological Methods, Optimum site conditions, Diversity over Time, Rotations, Diversity in space, Habitant enhancement, Role of Non-crop vegetation, Trap crops, Constructed traps, Plant resistance to pests, Traditional Practices for Pest Control, Other Management Practices
14. RICE-FISH INTEGRATION OF ORGANIC FARMING

Externalities of Green Revolution, Rice Productivity in States of India, Lowland Rice Ecologies, Diversification- IPS Approaches, A fish harvest from rice field, 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

15. CHOICE OF VARIETIES FOR ORGANIC FARMING

What is organic Agriculture?, Selection of rice varieties for organic farming, Weed Control, Soil fertility, Insects and Diseases, Speciality rices for organic farming, Varieties for Special systems of cultivation, Pokkali, Koottumundakan cultivation.
16. COASTAL AGRO-ECO SYSTEM IN ORGANIC RICE FARMING

Organic farming - the truths vs. myths, Organic food tastes better and is of superior quality, Organic food is more nutritious and safer, Organic farming is eco-friendly, 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)
17. MICROORGANISM FOR ORGANIC FARMING

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, Utilisation 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, Seedling root dip, Soil application, Foliar spray, Microbial consortium for rice
Niir Project Consultancy Services (NPCS) can provide Process Technology Book on Manufacture of Biofertilizer and Organic Farming

See more

https://goo.gl/QSRrth
https://goo.gl/8IWEuQ
https://goo.gl/fPbtJc
Visit us at

www.entrepreneurindia.co
Take a look at
NIIR PROJECT CONSULTANCY SERVICES
on #StreetView

https://goo.gl/VstWkd

www.niir.org
www.entrepreneurindia.co
Locate us on Google Maps

https://goo.gl/maps/BKkUtq9gevT2
Contact us

Niir Project Consultancy Services
106-E, Kamla Nagar, Opp. Spark Mall,
New Delhi-110007, India.
Email: npcs.ei@gmail.com, info@entrepreneurindia.co
Tel: +91-11-23843955, 23845654, 23845886, 8800733955
Mobile: +91-9811043595
Fax: +91-11-23841561
Website: www.entrepreneurindia.co, www.niir.org
Take a look at NIIR PROJECT CONSULTANCY SERVICES on
#StreetView

https://goo.gl/VstWkd
Niir Project Consultancy Services

An ISO 9001:2008 Company
Who are we?

- One of the leading reliable names in industrial world for providing the most comprehensive technical consulting services

- We adopt a systematic approach to provide the strong fundamental support needed for the effective delivery of services to our Clients’ in India & abroad
We at NPCS want to grow with you by providing solutions scale to suit your new operations and help you reduce risk and give a high return on application investments. We have successfully achieved top-notch quality standards with a high level of customer appreciation resulting in long lasting relation and large amount of referral work through technological breakthrough and innovative concepts. A large number of our Indian, Overseas and NRI Clients have appreciated our expertise for excellence which speaks volumes about our commitment and dedication to every client's success.
We bring deep, functional expertise, but are known for our holistic perspective: we capture value across boundaries and between the silos of any organization. We have proven a multiplier effect from optimizing the sum of the parts, not just the individual pieces. We actively encourage a culture of innovation, which facilitates the development of new technologies and ensures a high quality product.
What do we offer?

- Project Identification
- Detailed Project Reports/Pre-feasibility Reports
- Business Plan
- Industry Trends
- Market Research Reports
- Technology Books and Directory
- Databases on CD-ROM
- Laboratory Testing Services
- Turnkey Project Consultancy/Solutions
- Entrepreneur India (An Industrial Monthly Journal)
How are we different?

- We have two decades long experience in project consultancy and market research field
- We empower our customers with the prerequisite know-how to take sound business decisions
- We help catalyze business growth by providing distinctive and profound market analysis
- We serve a wide array of customers, from individual entrepreneurs to Corporations and Foreign Investors
- We use authentic & reliable sources to ensure business precision
Our Approach

- Requirement collection
- Thorough analysis of the project
- Economic feasibility study of the Project
- Market potential survey/research
- Report Compilation
Who do we serve?

- Public-sector Companies
- Corporates
- Government Undertakings
- Individual Entrepreneurs
- NRI’s
- Foreign Investors
- Non-profit Organizations, NBFC’s
- Educational Institutions
- Embassies & Consulates
- Consultancies
- Industry / trade associations

www.entrepreneurindia.co
Sectors We Cover

- Ayurvedic And Herbal Medicines, Herbal Cosmetics
- Alcoholic And Non Alcoholic Beverages, Drinks
- Adhesives, Industrial Adhesive, Sealants, Glues, Gum & Resin
- Activated Carbon & Activated Charcoal
- Aluminium And Aluminium Extrusion Profiles & Sections,
- Bio-fertilizers And Biotechnology
- Breakfast Snacks And Cereal Food
- Bicycle Tyres & Tubes, Bicycle Parts, Bicycle Assembling
Sectors We Cover

- Bamboo And Cane Based Projects
- Building Materials And Construction Projects
- Biodegradable & Bioplastic Based Projects
- Chemicals (Organic And Inorganic)
- Confectionery, Bakery/Baking And Other Food
- Cereal Processing
- Coconut And Coconut Based Products
- Cold Storage For Fruits & Vegetables
- Coal & Coal Byproduct
<table>
<thead>
<tr>
<th>Sectors We Cover Cont...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper &amp; Copper Based Projects</td>
</tr>
<tr>
<td>Dairy/Milk Processing</td>
</tr>
<tr>
<td>Disinfectants, Pesticides, Insecticides, Mosquito Repellents,</td>
</tr>
<tr>
<td>Electrical, Electronic And Computer based Projects</td>
</tr>
<tr>
<td>Essential Oils, Oils &amp; Fats And Allied</td>
</tr>
<tr>
<td>Engineering Goods</td>
</tr>
<tr>
<td>Fibre Glass &amp; Float Glass</td>
</tr>
<tr>
<td>Fast Moving Consumer Goods</td>
</tr>
<tr>
<td>Food, Bakery, Agro Processing</td>
</tr>
</tbody>
</table>
### Sectors We Cover

- *Fruits & Vegetables Processing*
- *Ferro Alloys Based Projects*
- *Fertilizers & Biofertilizers*
- *Ginger & Ginger Based Projects*
- *Herbs And Medicinal Cultivation And Jatropha (Biofuel)*
- *Hotel & Hospitability Projects*
- *Hospital Based Projects*
- *Herbal Based Projects*
- *Inks, Stationery And Export Industries*
Sectors We Cover cont...

- Infrastructure Projects
- Jute & Jute Based Products
- Leather And Leather Based Projects
- Leisure & Entertainment Based Projects
- Livestock Farming Of Birds & Animals
- Minerals And Minerals
- Maize Processing (Wet Milling) & Maize Based Projects
- Medical Plastics, Disposables Plastic Syringe, Blood Bags
- Organic Farming, Neem Products Etc.
Sectors We Cover

- Paints, Pigments, Varnish & Lacquer
- Paper And Paper Board, Paper Recycling Projects
- Printing Inks
- Packaging Based Projects
- Perfumes, Cosmetics And Flavours
- Power Generation Based Projects & Renewable Energy Based Projects
- Pharmaceuticals And Drugs
- Plantations, Farming And Cultivations
- Plastic Film, Plastic Waste And Plastic Compounds
- Plastic, PVC, PET, HDPE, LDPE Etc.
Sectors We Cover

- Potato And Potato Based Projects
- Printing And Packaging
- Real Estate, Leisure And Hospitality
- Rubber And Rubber Products
- Soaps And Detergents
- Stationary Products
- Spices And Snacks Food
- Steel & Steel Products
- Textile Auxiliary And Chemicals
<table>
<thead>
<tr>
<th>Sectors We Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Township &amp; Residential Complex</td>
</tr>
<tr>
<td>○ Textiles And Readymade Garments</td>
</tr>
<tr>
<td>○ Waste Management &amp; Recycling</td>
</tr>
<tr>
<td>○ Wood &amp; Wood Products</td>
</tr>
<tr>
<td>○ Water Industry (Packaged Drinking Water &amp; Mineral Water)</td>
</tr>
<tr>
<td>○ Wire &amp; Cable</td>
</tr>
</tbody>
</table>
Contact us

Niir Project Consultancy Services
106-E, Kamla Nagar, Opp. Spark Mall,
New Delhi-110007, India.
Email: npcs.ei@gmail.com, info@entrepreneurindia.co
Tel: +91-11-23843955, 23845654, 23845886, 8800733955
Mobile: +91-9811043595
Fax: +91-11-23841561
Website: www.entrepreneurindia.co, www.niir.org
Take a look at NIIR PROJECT CONSULTANCY SERVICES on #StreetView
https://goo.gl/VstWkd
THANK YOU!!!

For more information, visit us at:

www.entrepreneurindia.co
www.niir.org