Coconut is one of the oldest crops grown in India and presently covers 1.5 million hectares in this country. Found across much of the tropic and subtropical area, the coconut is known for its great versatility as seen in the many domestic, commercial, and industrial uses of its different parts. Coconuts are part of the daily diet of many people. Its endosperm is initially in its nuclear phase suspended within the coconut water. As development continues, cellular layers of endosperm deposit along the walls of the coconut, becoming the edible coconut flesh. When dried, the coconut flesh is called copra. The oil and milk derived from it are commonly used in cooking and frying; coconut oil is also widely used in soaps and cosmetics. The clear liquid coconut water within is a refreshing drink and can be processed to create alcohol. The husks and leaves can be used as material to make a variety of products for furnishing and decorating. It also has cultural and religious significance in many societies that use it. India stands third in the production of coconut in the world. There are only two distinguishable varieties of coconut; the tall and the dwarf. As a result of cross pollination in the tails, a wide range of variations occur within the same variety. Coconut based cropping/farming systems promote on farm diversity and strengthens ecological base of coconut farming. Coconut husk is the raw material for the coir industry. It is also used as a domestic fuel and as a fuel in copra kilns. Coconut oil comes under edible/industrial group, is used as cooking oil, hair oil, massage oil and industrial oil. It is dominated by saturated fats and high percentage of lauric acid. India accounts for the 18% of total coconut production in the world and it is the third largest coconut producing country in the world. Coconut processing adds value, and a number of products like coconut oil, desiccated coconut, coir fibre, pith, mattresses, desiccated coconut (DC), coconut cream, coconut milk, spray dried coconut milk powder, coconut shell products, shell charcoal, shell powder, virgin coconut oil are obtained. The demand for coconut oil increases 15 to 20% during the festival season. Coconut oil for edible purposes is now being claimed to be the second best edible oil in the world, after Olive oil. Coconut shell charcoal is most widely used as domestic and industrial fuel.

Some of the fundamentals of the book are product diversification in coconut, future of coconut oil, scope for product diversification, varieties of coconut, farming systems in coconut, organic farming of coconut, spices and herbs, establishment and maintenance of organic coconut plantations, production of organic spices, medicinal and aromatic plants along with coconut, crop improvement, green manuring in coconut garden
organic recycling in coconut, soil moisture conservation in coconut garden, harvest and post harvest technology, integrated farming in coconut holdings for productivity improvement, machinery and processing of desiccated coconut, coconut processing sector in India, etc.

Coconut plays an important role in the economic, social and cultural activities of millions of people in our country. India is a major producer of coconut in the world. Coconut provides food, edible oil, industrial oil and health drink to humanity. All parts of coconut tree is useful in one way or other and the crop profoundly influences the socio economic security of millions of farm families. The present book contains the methods of cultivation and processing of coconut. This book is very beneficial for agriculturist, researchers, professionals, entrepreneurs, agriculture universities etc.

Contents

1. PRODUCT DIVERSIFICATION IN COCONUT
   Future of Coconut Oil
   Scope for Product Diversification
   Philippines
   Sri Lanka
   India
   Other Uses
   Conclusion

2. VARIETIES OF COCONUT
   Tall Variety
   West Coast Tall
   East Coast Tall
   Lakshadweep Ordinary
   Lakshadweep Micro
   Andaman Ordinary
   Andaman Giant
   Kappadam
   Laguna
   San Ramon
   Macapuno
   Spicata
   Performance of exotic cultivars under Indian conditions
   Dwarf Variety
   Ghowghat Green Dwarf
   Chowghat Orange Dwarf
   Malyan Dwarf
   Gangabondam
   Ayiramkachi
   Thembili (King Coconut)
   Coonino
   Mangipod
   Niuleka

3. FARMING SYSTEMS IN COCONUT
   Rooting Pattern
   Crown Structure And Light Transmission
   Water Use Efficiency
Nutrients
Choice of Inter / Mixed Crops
Criteria For Selection Of Inter/
Mixed Crops

4. ORGANIC FARMING OF COCONUT, SPICES AND HERBS
Organic Coconut Scenario
Scope For Organic Production of Coconut In India
Characteristics of A Typical Organic
Coconut Farm
Establishment And Maintenance of Organic Coconut Plantations
Conversion Period
Buffer Zone
Choice of Varieties
Raising Nursery
Land Preparation
Preparations for Planting
Aftercare of the Young Plantation
Nutrient Management
Green Manuring and Cover Cropping
Utilization of Waste from Coconut Palm
Improving Soil Conditions
Plant Protection
Biocides
Contamination Control
Soil and Water Conservation
Bee Keeping
Animal Husbandry
Conversion of Established Plantations
Conversion Period
Choice of Cultivars/Varieites
Composting of On-farm Crop Residues/
Farm Wastes
Nutrition Management
Weed Management
Processing of Organic Coconut
Production of Organic Spices, Medicinal And Aromatic

Plants Along With
Coconut
Certification of Organic Products

5. PLANTING MATERIAL
Collection of Seednuts
Raising Nursery
Nursery Care
Seedling Selection
Polybag Nursery
Care of Polybag Nursery
6. GARDEN ESTABLISHMENT
Site Selection
Time of Planting
Planting System
Land Preparation And Preparation of Pits For Planting
Replacement of Unproductive Palms
Replanting
Under Planting
After Care

7. CROP IMPROVEMENT
Varieties
Tall Group
West Coast Tall
East Coast Tall
Lakshadweep Ordinary
Lakshadweep Micro
Andaman Ordinary
Kappadam
VPM-3
ALR (CN) 1
Dwarf Group
Dwarf Green
Dwarf Orange
Malayan Dwarf
Gangabondan
Choughat Orange Dwarf
Tall And Dwarf Hybrids
VHC 1
VHC 2
VHC 3

8. CROP PROTECTION
Insect Pests
Rhinoceros Beetle, Oryctes rhinoceros L.
Management
Red Palm Weevil, Rhynchophorus ferrugineus Oliv. (Curculionidae: Coleoptera)
Management
Black Headed Caterpillar, Opisina arenosella Meyr. (Cryptophasidae: Lepidoptera)
Management
Termite, Odontotermes obesus Ramb. (Termitidae: Isoptera)
Management
Lacewing Bug, Stephanitis typicus Dist. (Tingidae: Hemiptera)
Scale Insect, Aspidiotus destructor Sign. (Diaspididae: Hemiptera)
Management
Mealybug, Pseudococcus longispinus (T.).
P. citriculus G., Palmicultor palmarum (Eh.) (Pseudococcidae : Hemiptera)
Management
Slug Caterpillar, Latoia lepida Cram (Cochlidiidae: Lepidoptera)
Slug Caterpillar, Contheyla rotundula H.,
(Cochlidiidae: Lepidoptera)
Slug Caterpillar, Macropectra nararia M.  
(Hochliidiidae: Lepidoptera)  
Management  
White Leaf Roller, Gangara thyrsis M.  
(Hesperiidae: Lepidoptera)  
Green Leaf Roller, Suastus gremius F.  
(Hesperiidae: Lepidoptera)  
Long Green Caterpillar, Turnaca acuta W.  
(Notodontidae: Lepidoptera)  
Bag Worm, Manatha albipes M.  
(Psychidae: Lepidoptera)  
Management  
Nut Borer, Cyclodes omma V.H.  
(Noctuidae: Lepidoptera)  
Lesser Coconut Spike Moth, Batrachedra arenosella Wlk. (Cosmopterygidae: Lepidoptera)  
Flower Caterpillar, Syntomis passalis Fab. (Cosmopterygidae: Lepidoptera)  
Ash Weevil, Myllocerus curvicornis Fab.  
(Curculionidae: Coleoptera)  
Stem and Bark Weevil, Diocalandra stigmaticollis G. (Curculionidae: Coleoptera)  
Management  
Shot Hole Borer, Xyleborus perforans W.  
(Scolytidae: Coleoptera)  
Management  
Coreid Bug, Paradasynus rostratus Dist.  
(Coreidae: Heteroptera)  
Management  
Root Grub, Leucopholis coneophora Burm. (Melolonthidae: Coleoptera)  
Management  
Ant, Dorylus orientalis W.  
(Formicidae: Hymenoptera)  
Red Ant, Oecophylla smaragdina F.  
(Formicidae: Hymenoptera)  
Non Insect Pests  
Mites  
Management  
Package of Recommendations  
Management  
Nematodes  
The Burrowing Nematode, Radopholus similis  
Management  
The Coconut Nematode, Rhadinaphelenchus Cocophilus  
Rodent Pests  
Management  
Management  
Squirrel, Funambulus Palmarum  
Monkeys  
Storage Pests  
Management  
Diseases
<table>
<thead>
<tr>
<th>Disease</th>
<th>Causal Organism</th>
<th>Symptom</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bud Rot</td>
<td>Phytophthora palmivora Butler</td>
<td></td>
<td>Preparation Of 1% Bordeaux Mixture</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td>Bordeaux Paste</td>
</tr>
<tr>
<td>Thanjavur Wilt</td>
<td>Ganoderma lucidum (Leyss) Karst and G. applanatum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stem Bleeding. Thielaviopsis paradoxa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf Blight, Pestalotia palmarum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pencil Point â€” (Tapering Wilt)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tatipaka Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crown Choke Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Button Shedding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Root Wilt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf Rot, Colletotrichum gloeosporioides,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exserohilum rostratum, Fusarium solani</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mahali (Fruit Rot and Nut Fall),</td>
<td>Phytophthora palmivora</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation Of 1% Bordeaux Mixture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bordeaux Paste</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. INTEGRATED DISEASE MANAGEMENT

Bud Rot Causal Organism
Symptom
Control
Preparation Of 1% Bordeaux Mixture
Bordeaux Paste
Root Disease
Symptoms
Management
Leaf Rot
Causal Organisms
Symptom
Control
Stem Bleeding Disease
Causal Organism
Symptom
Control
Thanjavur Wilt/Ganoderma Disease
Causal Organism
Symptom
Management
Mahali (Fruit Rot And Nut Fall)
Causal organism
Symptom
10. GARDEN MANAGEMENT

Intercultivation

Fertilizer Recommendations For
Coconut - A Summary

Deficiency Of Nutrients
Nitrogen
Potassium
Magnesium
Boron
Sulphur
Chlorine

Green Manuring In Coconut Garden

Organic Recycling In Coconut

Organic Recycling in Coconut Based
Farming System

Leguminous Green Manure Plants for
Sustaining Coconut Yields

Basin Management with Legume Cover Crops
Growing of Gliricidia as green leaf manure crop
in coconut garden under littoral sandy soil

Recycling of organic wastes from coconut palm
Direct utilization of coconut wastes as mulch

Vermicomposting
Coir pith composting

Water Management
Automatic Irrigation System

Drainage

Weed Control

Soil Moisture Conservation In Coconut Garden

Coconut Based Cropping Systems

Rooting Pattern
Canopy Structure And Light Utilization

Criteria For Selection Of Subsidiary Crops
Intercropping Systems

Tuber Crops
Rhizome Spice Crops
Cereals
Vegetables
Pulses
Oil Seeds
Fruit Crops
11. HARVEST AND POST HARVEST TECHNOLOGY
Harvesting
Storage And Seasoning
Post Harvest Processing
Husking
Copra Processing
Sun Drying
Solar Dryer
Indirect Drying
Small Holderâ€™s Copra Dryer
Smoke Free Copra Dryer For Medium Holdings
Large Holderâ€™s Copra Dryer
Electrical Copra Dryer
Ball Copra
Copra Grading
Copra Moisture Meter
Coconut Products And Byproducts
Desiccated Coconut
Tender Coconut Water
Snow Ball Tender Nut (Sbtn)
Matured Coconut Water
Nata-De-Coco
Coconut Milk And Milk Products
Coconut Cream
Coconut Spray Dried Milk Powder
Toddy
Coconut Byproducts
Byproducts From Husk
Coconut Shell Charcoal
Activated Carbon
Shell Flour
Coir And Coir Products
Handicrafts From Coconut
Coconut Wood Processing
Mushroom Cultivation Using Coconut Byproducts
12. INTEGRATED FARMING IN COCONUT HOLDINGS FOR PRODUCTIVITY IMPROVEMENT

13. FINANCIAL ASSISTANCE TO PROCESSING INDUSTRIES

14. COCONUT HUSK
   Coir
   Coir Geotextile
   Coir Pith

15. COCONUT OIL
   Properties Of Coconut Oil
   Extraction Of Coconut Oil
   Coconut Oil Based Oleochemicals
   Coconut oil based Oleochemicals:
   Coconut Oil Cake

16. MACHINERY AND PROCESSING OF DESICCATED COCONUT
   Abstract
   Introduction
   Desiccated Coconut
   Processing Of Desiccated Coconut
   Plant & Machinery For Desiccated
   Coconut
   Drying Of Desiccated Coconut
   The Pilot Plant
   Results And Observations
   Scale-Up
   Quality Of Desiccated Coconut
   Conclusions

17. QUALITY STATUS OF DESICCATED COCONUT
   Abstract
   Introduction
   Materials And Methods
   Results And Discussion

18. COCONUT PROCESSING SECTOR IN INDIA
   Trend In Area, Production And
   Productivity
   Coconut Industry Vs Indian Economy
   Present Status Of The Coconut
   Processing Sector
   Traditional Coconut Products
   And Technological Innovations
   Copra
Sun drying
Kiln drying
Indirect hot air drier
Solar drying
Improvement in drying
Coconut Oil
Desiccated Coconut
Coir and Coir Products
Emerging Technologies In The
Processing Sector
Wet Processing of Coconut
Coconut Cream
Coconut Milk Based Consumer Products
Coconut Shell Based Products
Coconut Shell Charcoal
Activated Carbon
Methods of Processing
Destructive Distillation of Shells
Coconut Shell Powder
Miscellaneous Uses of Shells
Coconut Water
Coir Pith and Miscellaneous Products
Problems And Constraints
Future Strategy

19. VINEGAR FERMENTATION WITH SPECIAL EMPHASIS ON POSSIBILITIES OF UTILIZATION OF
MATURED COCONUT WATER
Production And Volume
Raw Materials
Production Of Vinegar
Acetification Methods
The Orleans Process or Slow Process or
French Process
Quick Process or German Process
Submerged Method
Other Modern Processes
Coconut Water As Possible Substrate
For Vinegar Fermentation
Preparation of Coconut Water Medium
Pfa Specifications For Vinegar
Standards
Problems In Vinegar Manufacture
Ageing Of Vinegar

20. ACTIVATED CARBON FROM COCONUT SHELLS: SIGNIFICANCE AND PROSPECTS
Protection Against Toxic Gases
Air Purification And Recovery
Purification Of Various Gases
Filters For War Gases/ Nuclear
Fall-Outs
Purifying Working Environments
And Elimination Of Odours
Recovery Of Solvents And
Other Vapours
Typical Plants where Such Solvents are Recovered
Separation Of Hydrocarbon Mixtures
Purification Of Fermentation
Carbon Dioxide
Recovery Of Gold
Carbon Batteries
Miscellaneous Applications
Activated Carbon As Catalyst
And Catalyst Carriers
Impregnated Carbons
Activated Carbon In Pollution
Control
Conclusion

21. COMMERCIAL EXPLOITATION OF COCONUT PITH
Introduction
Coconut Pith
Utilisation Of Pith : Problems
Utilisation Of Pith : Prospects
Pith Fuel Briquettes Briquetting With Binders
Pith As An Ingredient In Agricultural/
Horticultural Farms
Pith As A Heat Insulating Material
Conclusion

22. MODERN SEMI AUTOMATIC COPRA MANUFACTURING UNIT USING
WASTE HEAT RECOVERY SYSTEM
Introduction
Present Uses Of Coconut Shell In India
Charcoal Manufacture And Waste
Heat Recovery Unit
Chemical Analysis And Calorific Value
Whu And Pyrolysis Process
Modern Semi-Automatic Copra
Drying Unit
Economic Of A Modern Copra
Drying Unit
Inference

23. COCONUT KERNEL PRODUCTS
Virgin Coconut Oil
Desiccated Coconut
Coconut Milk
Spray Dried Coconut Milk Powder

24. FOOD PRODUCTS
Commercial Products

25. COMMERCIAL PRODUCTS
Milling Copra
Preparation of Coconuts before Drying
Copra Drying Process and Methods
Sun Drying
Smoke Drying or Drying by Direct Heat in Kilns
Drying by Indirect Heat
The Quality of Copra
Oil Content of Copra
Storage of Copra
Deterioration of Copra
Grading of Copra
Moisture Determination
Coconut Oil
Oil Milling
Yield Of Oil From Copra
Physical Properties
Chemical Properties
Rancidity
Ensuring the Quality of Oil
Quality Standards for Coconut Oil
Uses of Coconut Oil
Consumption Of Coconut Oil And Heart Ailments
Coconut Cake
Use Of Coconut Cake
Coir Or Coconut Fibre
Natural Retting
Mechanical and Chemical Methods of Retting
Extraction of White Fibre
Extraction of Brown Fibre
Yield Of Fibre From Husk
Varieties Of Fibre And Grades
Chemical Composition
Spinning of Coir Yarn
Utilisation of Coir Fibre and Yarn
Rubberised Coir
Coir Pith Or Coir Dust

26. COCONUT SHELL AND MISCELLANEOUS PRODUCTS
Coconut Shell Charcoal
Covered Pit Method
Modified Pit Method
The Drum Method
Uses
Properties
Distillation Of Coconut Shells
Activated Carbon
Coconut Shell Flour
Other Uses
Miscellaneous Products

27. BY-PRODUCTS UTILISATION
Commercial Exploitation Of
Coconut Pith
Pith as a Heat Insulating Material
Coconut Oil
Coconut Product Diversification
Copra Making
White Copra Production
Ball Copra
Vinegar Making
Bio-Confectionaries from Coconut Water
Benefits from Bio-Sweets
Desiccated Coconut
Canning of Coconut Haustorium
Coconut Cream
Coconut Shell Powder
Coconut Milk
Coconut Oil Derivatives
Coconut Oil as an Edible Oil
Production Of Cocopeat
Granulated Charcoal
Biodiesel Plant-Oleochemical
Rubberised Coir Fibre Cushions
Coir Industry
Coconut Shell Based Products
Shell Charcoal
Coconut Shell and Wood Handicrafts
Activated Carbon from Coconut Shells
Protection against Toxic Gases
Purification of Various Gases
Recovery of Solvents and Other Vapours
Typical Plants Where Such Solvents are Recovered
Separation of Hydrocarbon Mixtures
Purification of Fermentation Carbon dioxide
Recovery of Gold
Carbon Batteries
As Catalyst and Catalyst Carriers
Impregnated Carbons
Global Competitiveness Of Coconut Industry
Exports
Competition from Other Oilseed Crops
Low Profitability
Fluctuating Prices
Inconsistent Supplies of Product
Strategies For Future

28. MATURE COCONUT
Optimum Stage For Harvesting
Coconuts
Dehusking
Home Preservation Of Split Coconuts
Mature Coconut Water Products
Coconut Water Beverages
Coconut Vinegar
Nata-De-Coco
Other Products

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,

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.