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
Biopesticides
Contamination Control
Soil and Water Conservation
Bee Keeping
Animal Husbandry
Conversion of Established Plantations
Conversion Period
Choice of Cultivars/Varieties
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
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 rotunda H., (Cochlidiidae: Lepidoptera)
Slug Caterpillar, Macrolectra nararia M. (Cochlidiidae: 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

Squirrel, Funambulus Palmarum

Monkeys

Storage Pests

Management

Diseases

Bud Rot, Phytophthora palmivora Butler  
Management

Thanjavur Wilt, Ganoderma lucidum (Leyss) Karst and G. applanatum

Management

Stem Bleeding. Thielaviopsis paradoxa

Management
Leaf Blight, Pestalotia palmarum Management
Pencil Point â€“ (Tapering Wilt) Management
Tatipaka Disease Management
Crown Choke Disease Management
Button Shedding Management
Root Wilt Management
Leaf Rot, Colletotrichum gloeosporioides, Exserohilum rostratum, Fusarium solani Management
Mahali (Fruit Rot and Nut Fall), Phytophthora palmivora Management
Preparation Of 1% Bordeaux Mixture Bordeaux Paste

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 Control
Leaf Blight Or Grey Leaf Spot
Symptom Control
Tatipaka Disease
Symptom Management
Crown Choke Disease
Symptom
Control

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
Floriculture
Medicinal And Aromatic Plants
Mixed Cropping
Cocoa
Pepper
Clove
Nutmeg
Cinnamon
High Density Multispecies Cropping System
Coconut Based Mixed Farming System
Coconut Based Sericulture System
Economic Aspects Of Coconut Cultivation

11. HARVEST AND POST HARVEST TECHNOLOGY
   Harvesting
   Storage And Seasoning
   Post Harvest Processing
   Husking
   Copra Processing
   Sun Drying
   Solar Dryer
   Indirect Drying
   Small Holder’s Copra Dryer
   Smoke Free Copra Dryer For Medium Holdings
   Large Holder’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
The Wet Meat Or Kernel
Coconut Milk and Related Products
Coconut Skim Milk And Related Products
Coconut Protein And Edible Oil
Krauss-Maffei/C.F.T.R.I. Process
Texas A & M University Process

NIIR Project Consultancy Services (NPCS) 11/15
The TPI Process
The Modified Solvol Process
Desiccated Coconut
Removal of the Kernels and Paring
Washing
Sterilising
Disintegrating and Desiccating
Edible Copra
Coconut Water
Foods uses of Coconut Water
Other Miscellaneous Uses
Toddy And Toddy Products
Tapping
The yield of Toddy
Suitability of Dwarf Palms
Tapping and Subsequent Yield of Nuts
Composition and Uses of Fresh Toddy
Jaggery
Refined Sugar
Treacle
Fermented Toddy
Arrack
Coconut Vinegar
Miscellaneous Products Of Food Value

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.  


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.

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

Sun, 27 Oct 2019 20:33:59 +0530